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car action

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HOT PISTOL!

HITEC AGGRESSOR CRX

JULY 2003

DURATRAX Nitro Evader ST—Fast, affordable, O.S. Engines-powered RTR

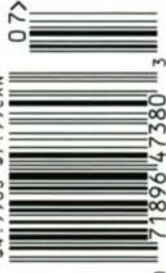
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VOLUME 18 ■ NUMBER 7 ■ JULY 2003



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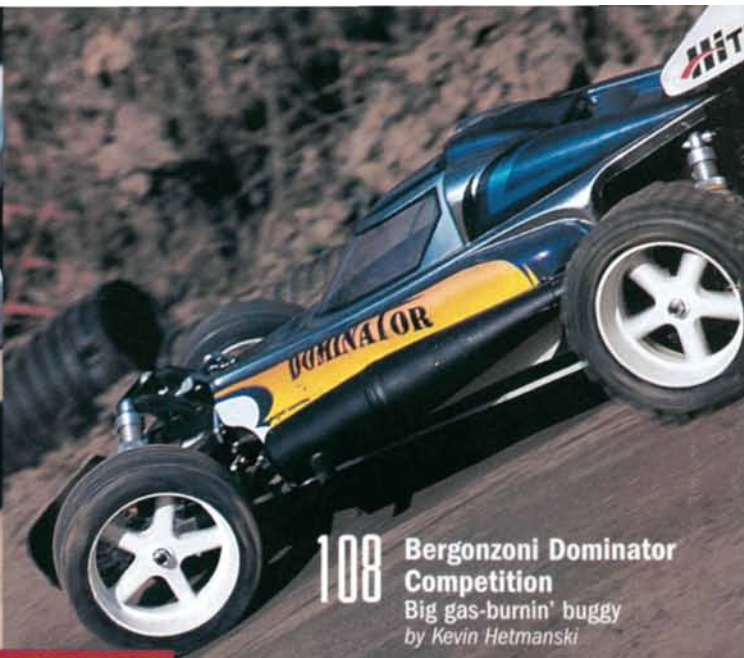
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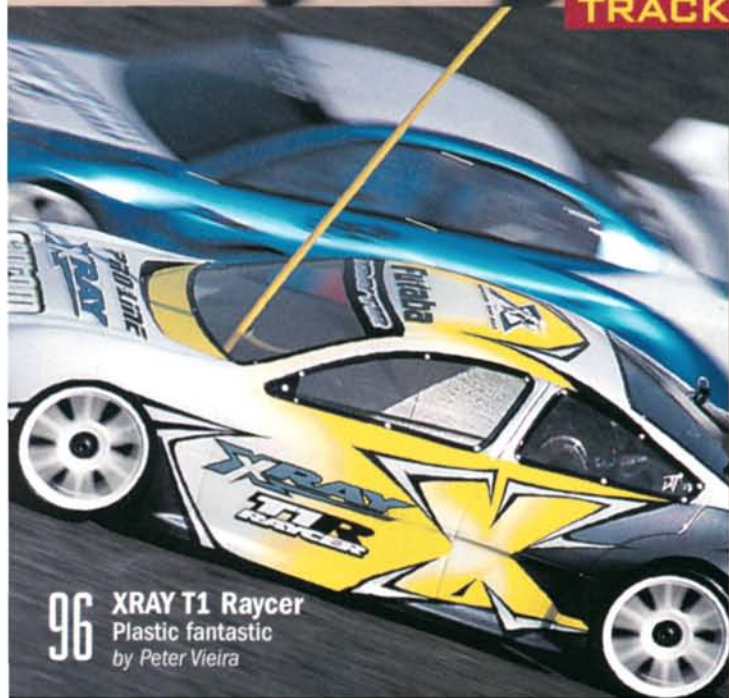


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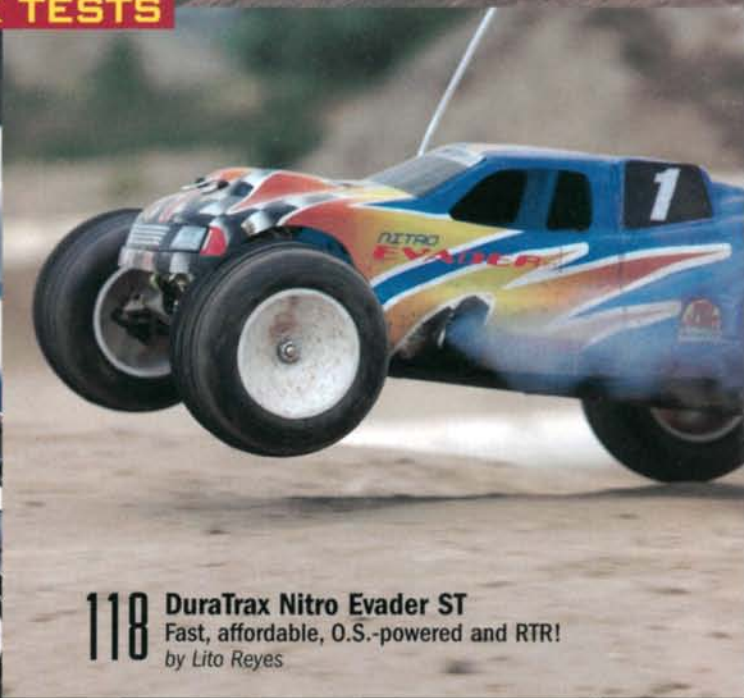


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BUGGIES ARE BACK!

RC cars got their start in the street, but for me, it all began with buggies. I wish I could say I was into RC back in those heady days of street racing with Heathkit Spectres and Associated RC1s, but cut me some slack; I was, like, seven years old. For me, RC happened in the '80s, when MTV was new (even as a kid, I knew Alan Hunter was a schmuck), Reagan was in office (twice!), and Thursday night "Must-See-TV" was "Buck Rogers" followed by "Quincy." At HobbyTown, Tamiya kits lined the shelves, and they were all about doin' it in the dirt with futuristic bodies and spiked tires. I lusted for a Hot Shot and wondered what the difference was between a Frog and a Hornet. (The smart-ass reply from the guy behind the counter was, "One's a reptile, the other's an insect." I didn't bother to tell him that frogs are amphibians.)

Fast-forward to the 21st century. We may not have flying cars hovering in the driveway, but there are still plenty of cars flying over jumps at RC off-road tracks. I still haven't gotten over how incredible it is to see RC cars jumping like Supercross bikes, under full control, and landing safely on all fours. I still get a kick out of doing dirt-spraying donuts, and I think the coolest-looking RC cars are electric buggies.

Of course, the coolest of them all right now is the RC10 B4 Stealth, which gets the "Track Test" treatment this issue. I'm really psyched about the B4, and not just because it's a fantastic car, and I got to test it. No; I'm psyched because the B4 (along with the Team Losi Triple-X4) has us all thinking about off-road buggies again, and that means more guys on the track in my favorite class. I like touring cars, I like trucks, but for me, nothing beats buggies. They're the best they've ever been, and this year's IFMAR 2WD Off-road World Championship is shaping up to be a massive battle. There's no better time to be a buggy guy!

IN THIS ISSUE

Novak motor magic. After much hype and even more waiting, Novak has finally pulled the trigger on the Super Sport brushless motor system. Does it work? We answer the heck out of that question with our in-depth review.

Peel and stick, right? If it was that easy, your car's body wouldn't be the wrinkled, bubbly, curling mess that it is. Read "How To Apply Decals Like a Pro," and make your next body your best.

Battery tips to believe in. Batteries ... they all look pretty much alike, and there's no way to know what's going on inside of them. No wonder so many of us aren't sure whether we're treating them right. All is explained in "Battery Golden Rules." It's a keeper.

Hitec hits a high note. If you're in the market for a new radio system, you need to take a look at our Aggressor CRX review. Not in the market for a radio? You might be after you see the CRX.

B4 and after! Everyone likes to see what the pro's do to their cars to give them an edge, and there's no hotter race car right now than the B4. In addition to this month's "Track Test" review, we've got an exclusive look at Ryan Maifield's Cactus Classic-winning B4 Stealth. Feel free to steal his setup.

Until next month!

Peter Vieira
Executive Editor

MAXIMUM VELOCITY

TOURING CARS COMING SOON!

The sedan scene is still going strong, and we have another packed edition of *Radio Control Touring Cars* on the way to prove it. What's inside? Head-to-head car tests, in-depth how-to's, top tuning advice, powerful project cars; you know—the usual! Look for *Touring Cars* at your favorite newsstand in July.



RADIO CONTROL car action

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READERS WRITE

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NITRO STAMPEDE 2.5?

After reading the reviews of the new TRX 2.5-powered 4-TEC and Rustler, I decided it's time to retire my old Nitro Rustler in favor of the new, more powerful version. But what about the Nitro Stampede? I'd put my well-worn "Pede" on the shelf and get a 2.5 version in a heartbeat. What are the chances?

Brian Wrobel

According to Traxxas, the TRX 2.5 engine is just too powerful for the Stampede, and it renders the truck virtually undrivable because of nonstop wheelies. Which makes us wonder ... is Traxxas tooling up an all-new Nitro Stampede?

—Pete

AGGRESSIVE DRIVER

Are you guys going to review the Hitec Aggressor CRX? I saw it in "Inside Scoop" and thought it looked great; then I saw the ad on the next page, and it looks like a great radio.

Bill Dent

That's because it is a great radio! George Gonzalez reviews the CRX in this issue. Is it just me, or does the guy in the Hitec ad look like A.J. from the Backstreet Boys? And if you're wondering how I know what the Backstreet Boys look like, it's because Kevin has a huge poster of them in his office.

—Pete

MUST ... HAVE ... MINI-Z

After reading the "First Drive" on the Kyosho Mini-Z Overland, I decided to get one. I'm

looking for the Mitsubishi Pajero version. My parents said I could get one as long as I buy it in the U.S.; they don't want me to buy it from overseas. The problem is that almost every place online is overseas; everything on eBay is overseas, too. Where can I get one at a reasonable price in the U.S.?

Derek Dong

Tower Hobbies is out of them as I write this, but the Overland Zs should be everywhere (including at your local hobby store) by the time the magazine is in your hands.

—Pete

SHIFTING ELECTRIC

With all of the gear-shifting nitro cars out there, why hasn't somebody put a 2-speed in an electric car? I know electrics accelerate quickly, but wouldn't the lower initial gearing ease the strain on the batteries and add to run times? Shouldn't the electric guys have the joy of hearing their cars shift, too?

Corey Allert

HPI and Kyosho have offered 2-speed trannys for electric cars in the past, but they're scarce now. Electric motors have far more low-rpm torque than nitro engines and simply don't need a low first gear to help them accelerate. And although it is cool to hear a car shift, the electric cars with 2-speeds that I've driven usually wind out first gear so quickly that you barely notice when the car shifts. For electric RC, the weight and complexity of a 2-speed seems to outweigh any advantages (or coolness) it might offer.

—Pete

NO DANGER! DANGER! DANGER!

Running Without a Proper Air Filter will ruin your expensive nitro engine in a matter of minutes!



Dirt and dust entering the engine acts like grinding compound (left) and instantly wears out the piston, sleeve and rod. When this happens compression is lost, the engine will stop, and at least **\$100.00** will need to be spent to make it run again!

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HPI, .12/.15 ready to run engines
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O.S., .12/.15 slide and rotary
Picco, .12 slide and rotary
Rossi, .12 slide
Sirio, .12/.15/.18 rotary
Traxxas, .12*

35FAT2K, Full Size Filter, Big Bore, Centered Mount

*Nova Rossi, .12 slide
O.S. TG, .12 slide
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Sirio, .12/.15/.18 slide
Traxxas, 2.5 T-Maxx
All .21 engines on and off-road*

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READERS WRITE

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ANOTHER SCENE STARTER

I thank you for leading me to find other RC guys at my school. I thought that I was the only one interested in RC until I took your mag to school. All of a sudden, I found two people already interested in RC, and two other guys bought trucks; one got a Rustler, and the other bought a new T-Maxx 2.5 the night after he saw it in your mag. As for me, I have a stock Bandit and an E-Maxx that will soon be brushless (woo-hoo!) and fit for racing. I enjoy the great action pics and very informative articles you guys write. I always make sure I read your mag first before I buy anything. Thank you for keeping on top of the RC scene!

Jonathan Montague

JUST ASK

I'm 14 years old and I live in Portland, OR. I have been into RC buggies for the past two years. I wonder what it takes to get a sponsor. Do you have to ask manufacturers to sponsor you?

Jason Littlejohn

RC manufacturers sponsor drivers who can win national events, so the manufacturers can then promote their products as "the widgets that won the Nationals." It's as simple as that. Make the A-main consistently at national-level events and regional championships, then ask manufacturers if they'd like to sponsor you. They might even ask you first.

—Pete

YOU SAID IT

"I'm going to suggest an RTR class to the shop owner"

I really liked "Starting Line" in the May issue of *RC Car Action*. Having an RTR class is a great idea. I got a friend of mine involved in RC about six months ago, and I asked him if he would race his new T-Maxx. He said he wouldn't until he got it hopped-up enough to keep up with all the other trucks in that class. That's also why I've never raced—because there wasn't any kind of beginner class. If there had been an RTR class, we both would have raced in it. I'm

going to suggest an RTR class to the owner of a new shop that opened near my house.

*Chris Horsley
Houston, TX*

I'm glad you liked my "Starting Line" piece, but I chose your letter for "You said it" because of your decision to actually take action and ask the shop owner to start an RTR class! In life, things happen because you make them happen. Good luck!

—Pete



Each month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice.

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

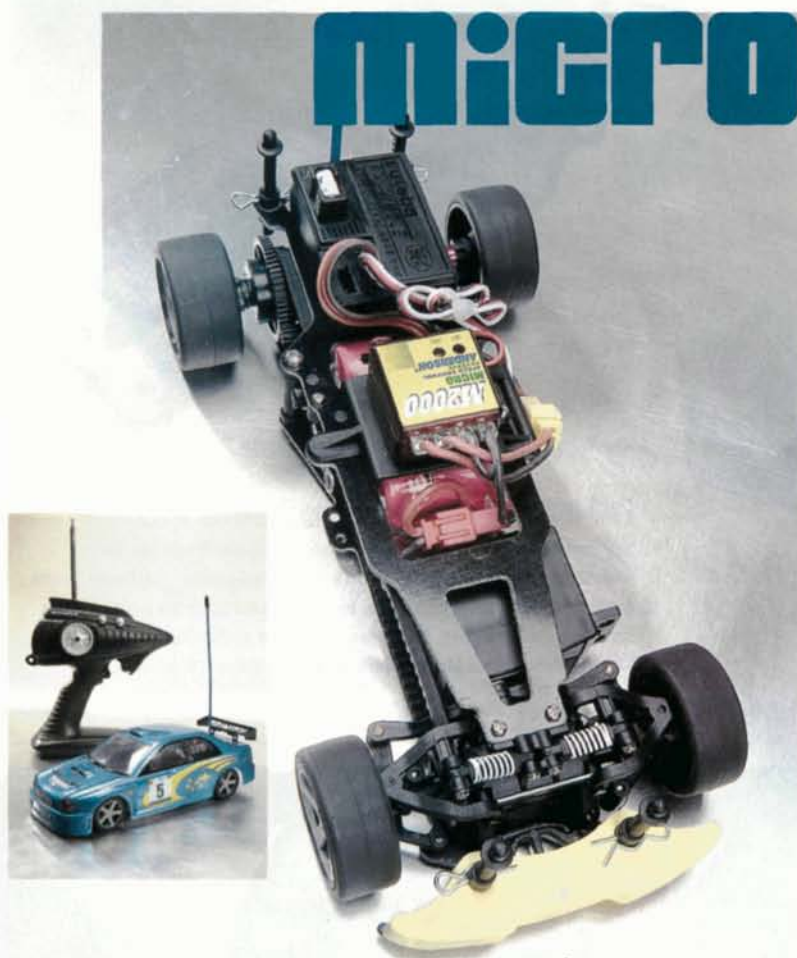
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micro madness

TRINITY Reflex Bantam micro touring car

Trinity has a brand-new micro car: the Reflex Bantam Micro. Its features include a 4WD belt-drive drive train, front and rear differentials, an adjustable wheelbase (140/150mm), adjustable front and rear track, independent front suspension with a U-bar-style rear suspension, adjustable body-mounting posts, a foam bumper, a quick-change battery-mount system and rubber tires (with included adapters for TRC foam tires). The car has room for most standard-size radio gear and is available in kit form and as an RTR package that includes a pistol-grip radio, a 6-cell battery pack and a charger.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.



SHOCKING NEWS

TEAM LOSI Shock Dyno

More often than not, cars handle poorly because their shocks aren't working in sync. There has never been an accurate way to judge whether the shocks on a car match—until now. Team Losi is set to release an all-new "shock-matching tool." Developed by Gil Losi Jr., the Shock Dyno allows you to check and compare O-ring condition, pressurization, spring balance and rate and how a shock setup or change compares with another. You can also use it to precisely match your shocks' length and shock limiting and to give you an accurate starting point for a spring change. Thank you, Gil!

Team Losi; distributed by Horizon Hobby Inc.
(800) 338-4639; teamlosi.com.



MUGEN TO RELEASE NEW X5



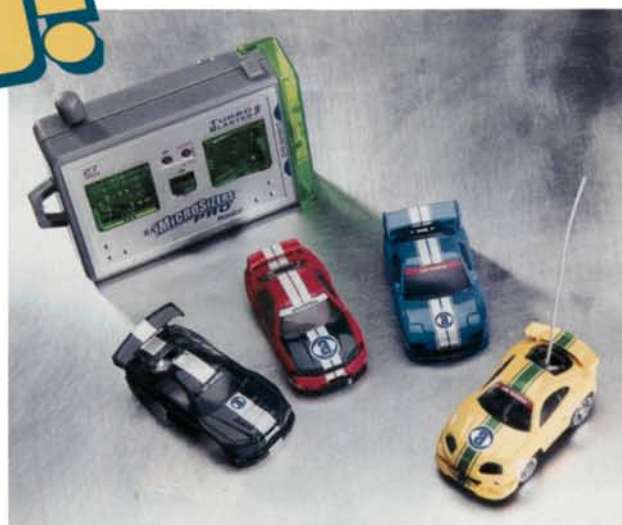
MUGEN SEIKI X5 1/8-scale buggy

We recently got the scoop that Mugen Seiki will release an all-new, top-of-the-line 1/8-scale nitro off-road racing machine for the upcoming season. The new design emphasizes a low center of gravity, or "CG," for superior handling, and it includes previously optional features to increase durability. Look for:

- Steering servo mounted below the servo plate for a lower CG.
- Recesses in the chassis lower the diffs, ring gears, engine and the radio tray.
- Chassis' components are closer to the centerline.
- Stronger 3.5mm-shaft, large-diameter shock absorbers.
- Longer suspension arms.
- Adjustable rear toe-in.
- Lightweight hinge pins replace pivot balls to reduce unsprung weight.
- Sealed bearings, universals and aluminum clutch shoes.

When we get our hands on one, we'll give you a full report!
Mugen USA (949) 707-5607; mugenracing.com.

GO MICRO PRO!



HOBBICO R/C MicroSizers Pro

New from Hobbico is this MicroSizers Pro edition that comes with four Auto Modellista body sets (based on Capcom's popular "cel-shaded" PlayStation 2 video game). In addition, the MicroSizer Pro comes with a hot 2.2 motor (which provides a slightly higher top speed), 9.86:1 gearing and new medium-compound slick tires. Hobbico/Great Planes Models Distributors (217) 398-8970; hobbico.com.

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PRO-LINE'S NEW TRAXXAS LIDS

PRO-LINE H2 & Crowd Pleazer bodies

Pro-Line recently released three bodies to help Traxxas owners complement their Rustlers and Stampedes. Two new Crowd Pleazer bodies fit the nitro and electric versions of the Rustler. They feature a low CG design, race-inspired lines and a distinctive front end. They are molded of durable 0.040-inch Lexan and come with window masks, decals and a protective "paint-then-peel" film. The other new body is a well-fitting H2 Hummer SUT for nitro and electric Stampede trucks. It looks perfectly proportioned sitting on top of the midsize monster.

Pro-Line (909) 849-9781;
pro-lineracing.com.



HERE'S SAND IN YOUR EYE

PRO-LINE SlingShot 1/8-scale paddle tire

Looking to throw a little sand around with your 1/8-scale buggy? Or do you plan to take your ride out to the sand dunes? If you do, you'll need these new SlingShot 1/8-scale paddle tires! According to the folks at Pro-Line, when they tested these tires in the sand, the 1/8-scale buggy kicked up a 3-foot-high, 7-foot-long roost! Looks as if it's time to head to the beach and impress the ladies

Pro-Line (909) 849-9781; pro-lineracing.com.



COOLER HEADS PREVAIL

TRINITY Monster Maxx engine head

This unique new head from Trinity is designed to allow you to fine-tune your engine's head either by adding or removing the included cooling fin. This setup is perfect for when you need to tune your engine for maximum performance on hot and cold days! The black-anodized Monster Maxx head fits Sirio .12, .15 and .18 engines, and it's laser-engraved with the "Monster Head" logo. The package includes the head, an extra fin, the cap and the necessary hardware.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.

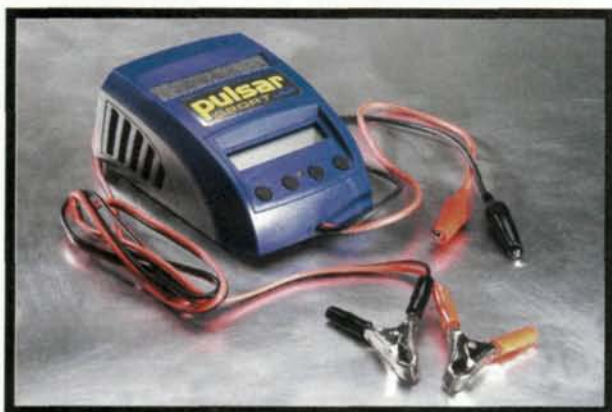
MINI-Z MELTDOWN

KYOSHO new Mini-Zs

We're all big fans of Kyosho's diminutive racers here at the office, and we recently received some of the latest body sets for the Overland off-roaders and the newest touring car and rally-inspired racers. Since we know how much you like them, too, we decided to show them off.

- Overland Toyota Land Cruiser 100 (Silver)
- Overland Toyota Land Cruiser 100 (Paris-Dakar Rally Version no. 239)
- WRC 2002 Subaru Impreza
- WRC Ford Focus RS
- Plus e Talsan Advan GT3R Porsche
- Viper GTS-R Team Larbre Competition-Chereau

Kyosho; distributed by Hobbico/Great Planes Model Distributors (217) 398-8970; hobbico.com.



PRO CHARGER FOR A SPORT PRICE

LRP Pulsar Sport charger

Are you one of those racers who doesn't need all the bells and whistles but still wants reliable performance and cutting-edge features? If you are, check out the LRP Pulsar Competition's little bro: the Pulsar Sport! Its features include pulse width modulation (PWM), a charge mode with an adjustable current limit of 0.1 amp to 7 amps and an 8-cell capacity. The Pulsar Sport also features an auto-restart (in the event of a power failure), adjustable Delta-peak cutoff, a large LCD, an easy-to-use navigation system and user settings that can be saved.

LRP Electronic; distributed by Team Associated (714) 850-9342; teamassociated.com; lrp-electric.de.

YOU GOTTA SCREW LOOSE?

FENDER BENDER screw kits

If you're like us, you probably always have to look for the one screw that fell off the bench and rolled into oblivion. Well, if that's the case, check out the FenDer BenDer offerings. There's a variety of screw kits for the most popular vehicles (the HPI Savage kit is shown here), and you can also purchase bags of screws separately (usually, six screws per bag). FenDer BenDer offers stainless-steel and standard steel screws.

FenDer BenDer;
benderstore.com. ■



readers' rides

YOUR BEST BUILDS

DEMETRIOUS MASON, GARY, IN FORMULA 1 COLLECTION

Capt. Demetrious Mason of the Gary, IN, fire department sent along a few snapshots of his massive RC collection (roughly 27 cars by our quick count). Out of that group, we selected this sample of his F1 collection (and the "odd man out" 1/5-scale DTM) to show you. The front nine 1/10-scale cars are nitro-powered, and the back eight are electric open-wheelers. Bergonzoni makes the two 1/5-scale cars that flank the groups. Every car is equipped with JR radio gear. Wonder whether he has it set up so they can all run at once?



PETE PASCUA HAGATNA HEIGHTS, GUAM TAMIYA BRUISER

Pete sent us this pic of his sweet-looking drag Bug that he uses to chase the local Chamorros. Underneath the HPI Baja Bug body is an extensively customized Bruiser chassis that has been modified with an ESP Clodzilla two-link suspension setup and is outfitted with a set of Imex pulling tires. Pete is the president of the Guanan RC Racer's Club, and he plans to outfit his project vehicle with a Traxxas E-Maxx drive train. We chose Pete's car as Reader's Ride of the Month because we simply can't remember the last time we saw anyone turn a Bruiser into a Bug dragger.



ROBERT MARROCO, ONTARIO, CANADA HPI SUPER NITRO RS4

Robert has spent plenty of time getting his Super Nitro dialed in just the way he wants it. Aside from completely decking the car out with the requisite aluminum hop-ups, Robert bolted in an OFNA .21 engine, and while he was at it, he had a local machine shop make a custom 2-speed for his new ride. To get even more speed out of the car, Robert had the engine ported and polished and the head shaved down slightly for additional compression. Last, but not least, Robert tells us that he replaced the stock pull-starter cord with heavy-duty fishing line that won't snap!



DEREK CARTER, LIBERTY, TN TEAM ASSOCIATED FACTORY TEAM RC10GT

With his hopped-up Factory-Team-edition GT, it looks as if Derek Carter is more prepared to take to the streets than to the track. He tells us that his truck is powered by a Fantom .12 with an O.S. 10ER carb and is equipped with a Futaba radio system. Other mods include RPM wheels outfitted with Pro-Line Road Rage tires, RPM suspension mounts, bulkheads and ball cups. Derek added a set of Robinson Racing gears as well as a host of other Factory Team upgrades.

WIN A ONE-YEAR SUBSCRIPTION TO RADIO CONTROL CAR ACTION MAGAZINE!

Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to *RC Car Action* and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. For email submission tips, visit rcraction.com and click "Readers' Rides."

ROBERT PERRETTI STEAMBOAT SPRINGS, CO OFF-ROAD COLLECTION

Robert obviously has an affinity for off-roading and racing! His collection consists of a modified Tamiya TXT-1, a Team Losi Matt Francis Triple-XT and a highly modified Team Associated RC10GT and B3. The TXT-1 has been set up with ball bearings, hotter-than-stock motors and a high-torque servo. The racers have been hopped up with competition equipment as well, and Robert painted each of the bodies.



SCOTT WILCOX, SEATTLE, WA TAMIYA TB EVOLUTION III

If you've ever seen the Australian V-8 Supercar series on the Speed Channel, then you're aware of just how cool the full-size touring-car series is. Scott Wilcox is a big fan of the series, and during the past winter, he set out to replicate the Australian AU Ford Falcon Shell Helix-sponsored car driven by Paul Radisich. According to Scott, he tried to duplicate that car, but he had to work around the limitations of the Frewer body set that he started with. He also had to find the appropriate graphics sets and choose from the limited fonts in his design cutter. Scott outfitted his Tamiya tourer with a Trinity P94 8-turn double, a DuraTrax ESC and Trinity VIS 3300 batteries, and he controls it with a JR XR3i radio.

The Best Kept Secret in Racing...

REEDY

Reedy "X-cell" GP3300's.
Reedy/Yokomo Gold Peak 3300's have longer run times than most other 3300 Ni-MH cells, and have a great low price that makes them your **BEST** choice!

#665 Reedy GP3300
"X-cells", 6-Cells...\$89.99

#664 Reedy GP3300
"X-cells", 4-Cells... \$59.99



Reedy 3300 "Extreme" Sanyos. The newest 3300 Ni-MH cells from Sanyo! The Reedy 3300 "Extreme" cells are cycled, matched, and voltage treated for on-track performance you can really feel.

#660 Reedy 3300 "Extreme" Sanyos, 6-Cells...\$129.99

#659 Reedy 3300 "Extreme" Sanyos, 4-Cells... \$87.99

AL MELVILLE, BELVIDERE, IL KYOSHO KX-1

Al's Kyosho KX-1 is chillin' underneath this sweet-looking HPI Supra body (FasKolor purple, to be exact). He created the wild-looking hood design by scanning the logo from a No Fear T-shirt and then used a sticker machine to re-create the original. Al then stuck the sticker inside the body and painted over it. The rear wing is handmade from a combination of Lexan and leftover material from a carbon-fiber body, and it's held in place by Tamiya wing mounts. As for electronics, Al uses a Reedy 10-turn and an LRP ESC, and he controls the car with a JR XR3i radio.



JEFF FLOOD, SAN DIMAS, CA TEAM LOSI TRIPLE-XNT

What really sold us on Jeff Flood's Triple-XNT was his wind-shield visor sticker; anyone who flies the "White Trash" colors is OK by us. When he isn't too busy sloppin' all that extra mayo on his white bread or stacking more cinder blocks under the doublewide, Jeff adds goodies to his truck. So far, he has modified it with a Trinity receiver pack, titanium turnbuckles and ball studs, aluminum pivot blocks, titanium-nitride shock shafts, Hitec radio gear, a Crowd Pleazer body and last, but not least, graphite shock towers and suspension arms. ■

and New **MATCHED** Sport Packs!



Reedy's "Rated-X" Matched sport pack batteries use genuine Panasonic or Sanyo Ni-MH cells that have been given the same cycling, matching, and voltage treating as Reedy's championship-winning racing cells. The batteries are fully assembled in clear tubes so you can see the matching info right on the label of each cell. Don't settle for "mystery" cells in your sport packs... get Reedy's "X-Rated" packs and see the power you've been missing!

REEDY

#698 Reedy "Rated-X" Sport Pack, Sanyo cells

#699 Reedy "Rated-X" Sport Pack, Panasonic cells

ONLY
\$59.99

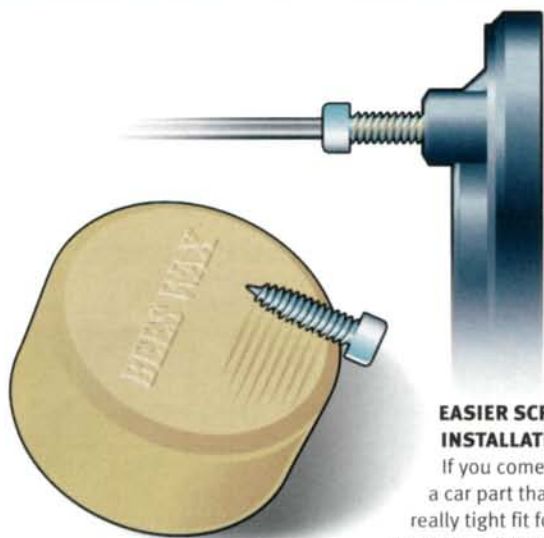


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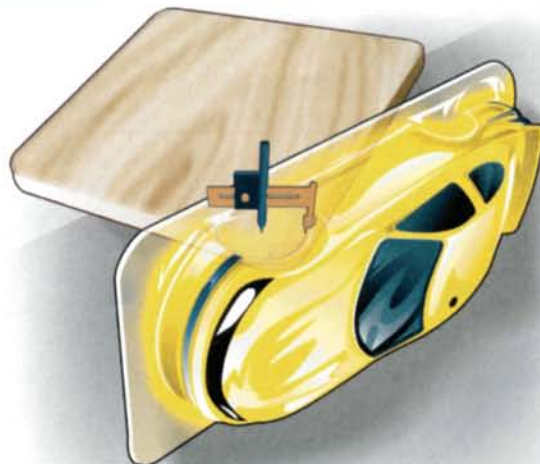
HINTS, TRICKS, TIPS AND IDEAS FROM READERS LIKE YOU



EASIER SCREW INSTALLATION

If you come across a car part that is a really tight fit for its fastener, rub beeswax on the fastener's threads. The beeswax will act as a lubricant to make it easier to screw the part into the tight fitting. You'll find beeswax at most hardware stores.

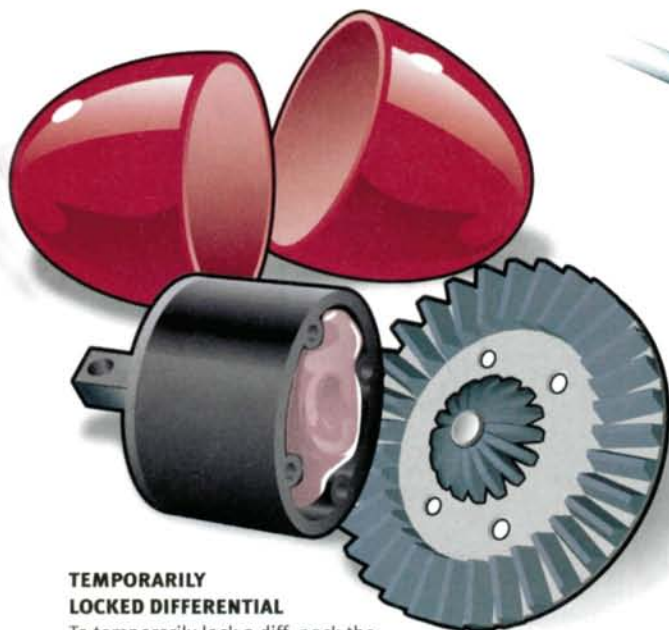
*Anthony Harris
Lakewood, OH*



PERFECT WHEEL WELLS

When you use a circle cutter to cut out a body's wheel wells, the blade might wander because the body will bend when you press on it with the cutter. Remedy this by holding a stiff flat object—a kitchen cutting board, for example—behind the wheel well so that the body stays rigid.

*Paul Matthews
Roanoke, VA*



TEMPORARILY LOCKED DIFFERENTIAL

To temporarily lock a diff, pack the diff case with Silly Putty. Unlike epoxies or glues, Silly Putty can be easily removed from the case when you want to return your diff to normal action.

*Al Arnold
Festos, MO*



SHORT PROTECTION

If you hard-wire leads to a battery pack, protect the pack from shorting out by placing a piece of double-sided tape under the battery bar on the pack's positive side. The tape will stop drips of solder from touching the end of a cell and shorting it out.

*Mark Gall
Concord, CA*

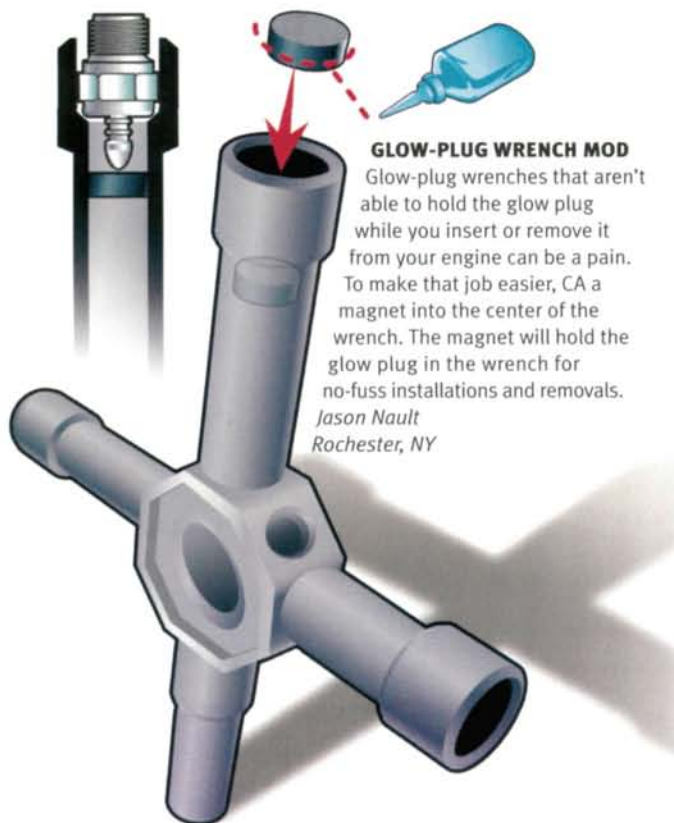


MAGNETIC ATTRACTION

If you clean metal parts by soaking them in a bowl of solvent, use a magnet to easily retrieve them from the container and to save the solvent. Move the magnet on the outside of the container until it attracts the part you want to remove, and then simply slide it (and the part) up the container's side to the top.

*Geoff Ledford
Fort Worth, TX*

WIN AN OFNA YO-YO, OFNA OB4 AND RC CAR ACTION SUBSCRIPTION! SEE NEXT PAGE FOR DETAILS.



GLOW-PLUG WRENCH MOD

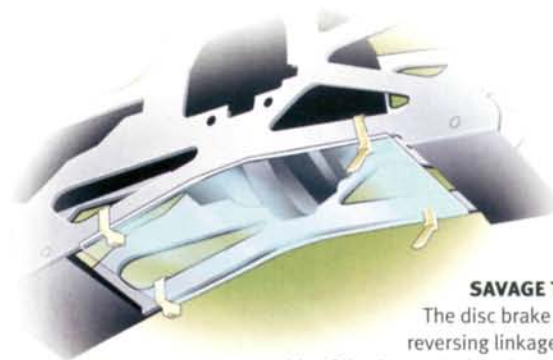
Glow-plug wrenches that aren't able to hold the glow plug while you insert or remove it from your engine can be a pain. To make that job easier, CA a magnet into the center of the wrench. The magnet will hold the glow plug in the wrench for no-fuss installations and removals.

Jason Nault
Rochester, NY

EASY SIMULATED EXHAUST PIPE

Remove the eraser section from a mechanical pencil and take out the eraser. The tube will look like the end of an exhaust pipe. Cut a hole in the body and attach the "exhaust pipe" to the body with Shoe-Goo.

David Magee
Elon, NC



SAVAGE TRANNY GUARD

The disc brake and optional reversing linkage on the underside of the Savage's chassis are susceptible to being damaged by rocks and other objects. Protect these components by attaching a piece of scrap Lexan to the bottom of the chassis with zip-ties.

Adam Simmer
Butler, PA



EASY SYNTHESIZED RECEIVER ACCESS

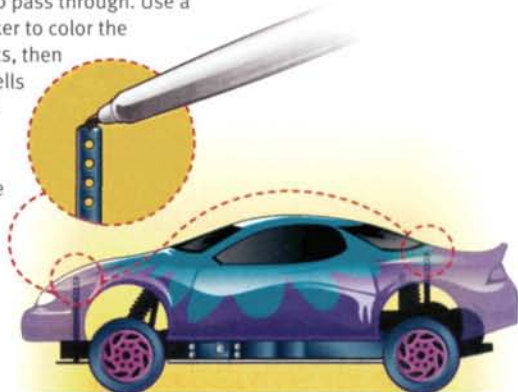
If your car uses a protective plastic receiver box and you have one of the new synthesized receivers, this tip is for you. Instead of disassembling the box when you need to change channels, install a hinged screw cover on it. You'll find the covers in most hardware stores. Take the receiver box off the chassis, and drill a hole in it that's large enough for the cover; make sure that the hole is over the receiver dial area, and then glue the cover into place. When you need to change the setting on the receiver, just flip the cover open.

Scott Amarosso
Phoenix, AZ

BODY-POST MARKING

When you want to mount a body that has been painted, it can be difficult to find the correct spots for the body posts to pass through. Use a permanent-ink marker to color the top of the body posts, then line up the wheel wells and set the body on top of the posts. The marker ink will be transferred to the inside of the body to show you where to drill the body-post holes.

Sam Tre
Santa Rosa, CA



"Pit Tips" are submitted by readers and are screened for functionality, feasibility and safety but are not tested by Radio Control Car Action. Radio Control Car Action and the submitting authors are not responsible for personal injury or damage to models or tools resulting from readers' use of "Pit Tips."

WIN AN OFNA YO-YO AND RC CAR ACTION SUBSCRIPTION! RC Car Action will give a 6-month subscription (or extend an existing subscription) and an OFNA yo-yo to the author of each idea used in "Pit Tips." All "Top Tip" winners will be considered for "Tip of the Year" (selected at the end of each year). The "Tip of the Year" will win an OFNA car kit for its author. Send a rough sketch and a description to "Pit Tips," c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. CLEARLY PRINT YOUR NAME AND ADDRESS ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. You may also email your tip to pittips@rcrcaraction.com. Note: because of the number of ideas we receive, we can neither acknowledge every one nor return unused material.

troubleshooting

YOU'VE GOT PROBLEMS? WE'VE GOT FIXES.

STRIPPED-OUT SERVO

Every time I run my Team Associated T3, the steering-servo gear is stripped out. My friend recommended that I use a metal-gear servo, but I'm not sure whether I should get one. Also, after the gear is stripped, I have to take off the entire front end. Repeatedly taking it off and then putting it back on really sucks, and on top of that, I have lost all the screws. Can you help me with the servo-gear problem and tell me where to find a screw set for my truck? [email]

Matt Hibbets

Matt, you neglected to say what type of servo you use in your T3! If you use a standard servo (like the kind that comes in a budget-radio combo package), it may not be strong enough to handle the steering responsibilities that are thrown its way, and that's probably the case here. A racing truck requires a fairly strong servo to handle its steering needs. At the very least, you should run a servo with a minimum of 50 oz.-in. of torque. I recommend that you invest in a suitable replacement, and if you can fit it into your budget, buy a ball-bearing-supported servo. Metal-gear servos are stronger than their plastic-/nylon-gear-equipped counterparts, but they are also more expensive.

As for your recurring maintenance dilemma, I don't understand why you're going to such great lengths to get to your servo. You don't "have to take off the entire front end" each and every time to access your wounded servo. To get to the servo, simply remove the two screws that hold the servo mounts in place underneath the chassis, and then pop the ball cup off the servo steering horn. For the missing screws, head down to your local hobby shop and pick up a new screw kit; they're readily available.

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RRP
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They may not look the same, but Futaba's budget S3003 servo has 57 oz.-in. of torque, while the 9404 racing servo has close to 100 oz.-in. of torque.

REAL PERFORMANCE PRODUCTS!

T-Maxx/2.5-Maxx Steel Top Shaft

NEW



This precision machined **hardened** steel top shaft will fit all T-Maxx. Includes oversize ball bearing. RRP 8525

T-Maxx/2.5-Maxx FORWARD ONLY Steel Gear Kit

NEW



This kit contains a 26T **hardened** steel output gear, a forward drive hub adaptor, steel spacer and Pin. RRP 8586. **Hardened** aluminum version RRP 8585.

T-Maxx/2.5-Maxx Hardened Forward Primary Gear

Precision machined from solid steel and then **hardened**. RRP 8529. **Hardened** aluminum version RRP 8528.

NEW



www.robinsonracing.com

T-Maxx/2.5-Maxx Forward Primary and Reverse Gears

NEW



This kit contains a precision machined **hardened** steel primary forward gear, a **hardened** aluminum reverse gear and pin. RRP 8521

MAKE NO COMPROMISES!

T/E-Maxx/2.5-Maxx Accessory Spurs



A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72, 74 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

T-Maxx/2.5-Maxx Primary Reverse Gear

This gear is precision machined from solid aluminum and **hardened**. Includes pin. RRP 8522

NEW



T-Maxx/2.5-Maxx Lightened Spur And Double-Disc™ Slipper Kit



RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx/2.5-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor, 2 Slipper Pads and 2 Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8166 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx. Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

NITRO STORAGE

I get conflicting advice on how to properly store nitro fuel. I've been told to keep it off my garage floor, but others say that it's no big deal and to leave it anywhere I want. I've even heard that some people keep spare fuel in an extra refrigerator in the garage. What's the real deal? [email]

Ed Konkle

Well Ed, here's the deal regarding proper fuel storage:

1. When at the track or outdoors, make sure that you keep your fuel out of direct sunlight. If it sits in the sun for extended periods, the fuel's methanol can easily evaporate, and the fuel will lose its "oomph."
2. When storing fuel, keep it off a concrete floor. Concrete can "leech" the nitromethane content from the fuel's plastic container as if it were a sponge.
3. When you aren't using your fuel, make sure that the included insert cap is fully inserted under the screw-on cap.
4. Store the fuel in a dry, cool place. Putting it in the fridge is a little overkill, but Trinity does make some pretty nifty Nitro Kooler bags that help the fuel stay cool, and that prevents the nitromethane from evaporating through the bottle.

In addition to these guidelines, just try to use your fuel in a timely manner; it isn't exactly as drastic a change as when milk goes bad, but over time, it will lose its potency.



Don't store your nitro fuel on a concrete floor.



It's a good idea to insert the internal cap into the top of your fuel bottle whenever you put it away.

T/E-Maxx/2.5-Maxx Steel Diff Gear Set



T/E-Maxx/2.5-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP \$590

T-Maxx/2.5-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. Also fits newer T-Maxx. Older style half shafts use Brake Kit RRP \$560.

DON'T SETTLE FOR SECOND!



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T-Maxx Vented Flywheels



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP \$551 Blue, RRP \$550 Natural Silver
NEW 2.5-Maxx Vented Flywheel, Blue Only RRP \$552.

T/E-Maxx/2.5-Maxx Replacement Pinion



This precision machined steel pinion fits RRP \$590 Diff Gear. RRP \$591

FORWARD ONLY Racing Gearbox For T-Maxx/2.5-Maxx



Precision CNC machined from aircraft grade billet aluminum this FORWARD ONLY Racing Gearbox will give your T-Maxx or 2.5-Maxx a serious competitive edge. RRP \$595

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BATTERY BASICS

Between races, how do you guys store your batteries? I've heard that it's best to keep them charged and then re-peak them before a race, but I've always run mine until they fall off and then let them cool and put them away. I always thought that it would be a bad idea to store them charged. So how should I store my batteries? [email]

Darren Thomas

Some people have voodoo-type theories about proper battery storage. I spoke with numerous battery experts, and the consensus is to store Ni-Cd batteries dumped for both long term and short term storage. With NiMH cells, discharge the pack to 0.90 volt per cell (or 5.4 volts for a 6-cell pack) only if you plan to use it again within a week. If you are going to store the battery for a longer time, you should put 10 minutes of charge back into the pack at 4 amps. All batteries will discharge themselves during a period of inactivity, so if you leave a small charge in your NiMH cells, it will prolong the time it takes for the cells to "zero-out." Additionally, by leaving a small charge in your NiMH cells, you will help to prevent them from false-peaking the next time they are charged (NiMH cells have a greater tendency to false-peak than Ni-Cds).



Different types of batteries need different kinds of storage "prep."

RS4 Nitro Aluminum Brake Kit



Lightweight aluminum, variable braking system. RRP 1575

RS4 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling.
RRP 1570
RRP 1571 Pull Start

T-Maxx/2.5-Maxx Hardened Steel Clutchbells



CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

RS4 Nitro Small Aluminum Drive Pulleys



Hardened drive pulleys, sold in pairs. RRP 1538

48P Absolute Series Pinions



Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

48P / 64P SuperLite Aluminum Pinions



They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

Stealth Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any Associated or HPI electric car or truck. RRP 1860 thru RRP 1896.

RC-10GT 48 Pitch Spurs



Precision machined from heat-resistant, super tough plastic, these spurs mesh flawlessly with our Clutchbells. Available in 63T thru 67T, RRP 2263 - RRP 2267

48P Hard Nickel Plated Steel Pinions



These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

STRIPPIN' SPUR

My Traxxas E-Maxx blows through spur gears left and right! The only thing I've changed is that I now run a set of hotter modified motors, and I went up to a 72-tooth spur gear in place of the stock 68-tooth spur. I know that everything is running fairly tight, too; I've cranked on the slipper pretty hard, and my gear mesh is spot on! Any help would be greatly appreciated, as I'm tired of replacing the spur gear every time I race my truck at the local track. [email]

Brian Tait

Brian, are you certain that you're running your slipper set as tight as it can be? You have to make sure that the slipper is really locked down—especially if you run your Maxx under the more rigorous racing conditions. If it isn't as tight as it should be, the gear will quickly heat up and melt under the strain of the hotter motors. Make sure that you can get to the slipper nut properly when you tighten it down. There isn't a ton of room between the slipper nut and the speed control, so you should use an actual wrench instead of the included kit box wrench so you can really crank on it! ■

When you set up your E-Maxx, be sure that you really crank down on its slipper clutch. This will help to prevent your spur gear from melting—especially if you've installed hotter mod motors!



TOOLBOX

Tamiya glow starter & fuel bottle

Some nitro RTR kits include everything you need to get up and running, but sometimes they don't. If you recently purchased a nitro car or truck and you're missing certain elements, then check out this inexpensive glow starter and fuel-bottle combo from Tamiya. The glow starter requires a C-size alkaline battery, and the fuel bottle holds 250ml of fuel. Best of all, the package sells for roughly \$20!

Tamiya glow starter and fuel bottle—item no. 41056; \$19.95.

Tamiya America Inc. (800) 826-4922; tamiyausa.com.



NEED HELP?

Send your "Troubleshooting" questions and comments to troubleshooting@rcracing.com, or mail them to "Troubleshooting," c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. RRP 2365

RC10-GT Hardened Steel Idler Gear



Cut from solid steel stock, this RC10-GT gear is lightened and hardened for super quiet precision and extra long life. Black tranny grease included. RRP 2213

Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

RC-10GT Hardened Steel Clutchbells



These steel Clutch Bells are CNC machined from solid steel then the teeth are machined on. This makes the part stronger with less gear "run out". Available in 14T thru 20T, 22T and 24T. RRP 22XX

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Blue Lightened Slipper Kit



The rear plate is hard anodized and the front plate is color treated. The front plate holds the pad forcing it to slip on the rear plate. When pad wears, just flip it over for a new surface. RRP 1515 Associated

Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT

TC3 Ultra 48 Pitch Spurs



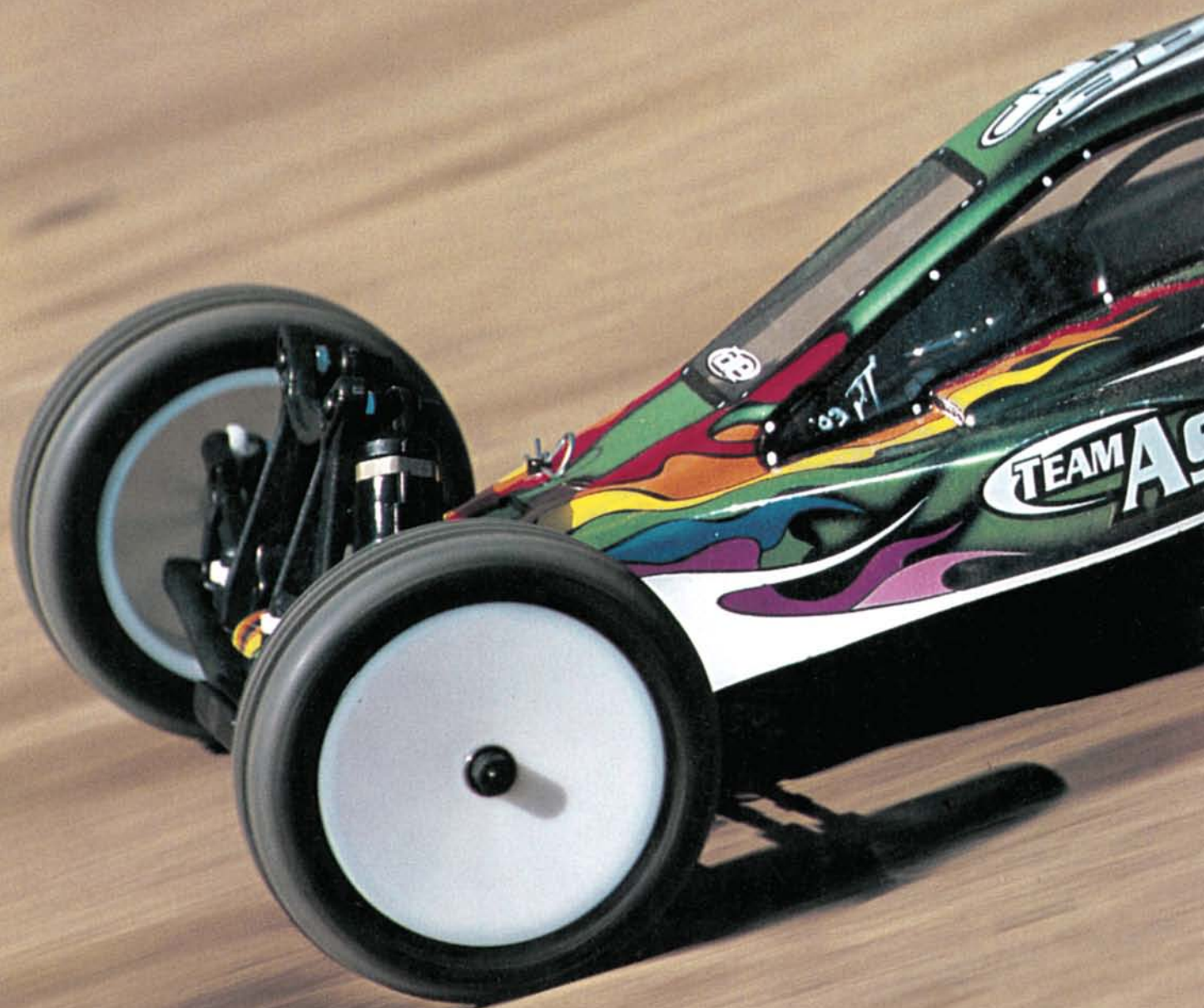
Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T, RRP 1670 - RRP 1680.



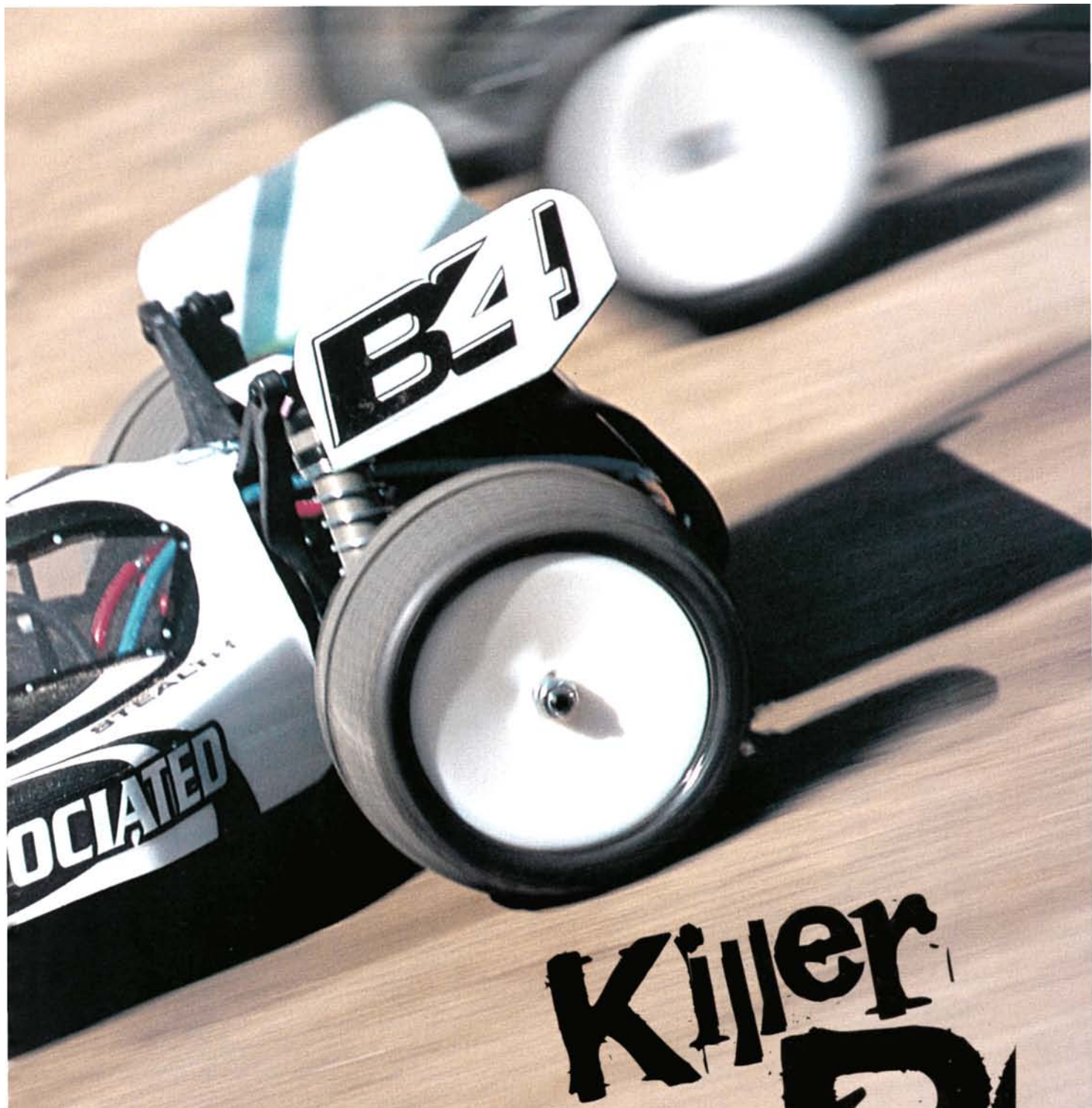
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Associated RC10 B4 Stealth



PHOTOS BY PETE HALL

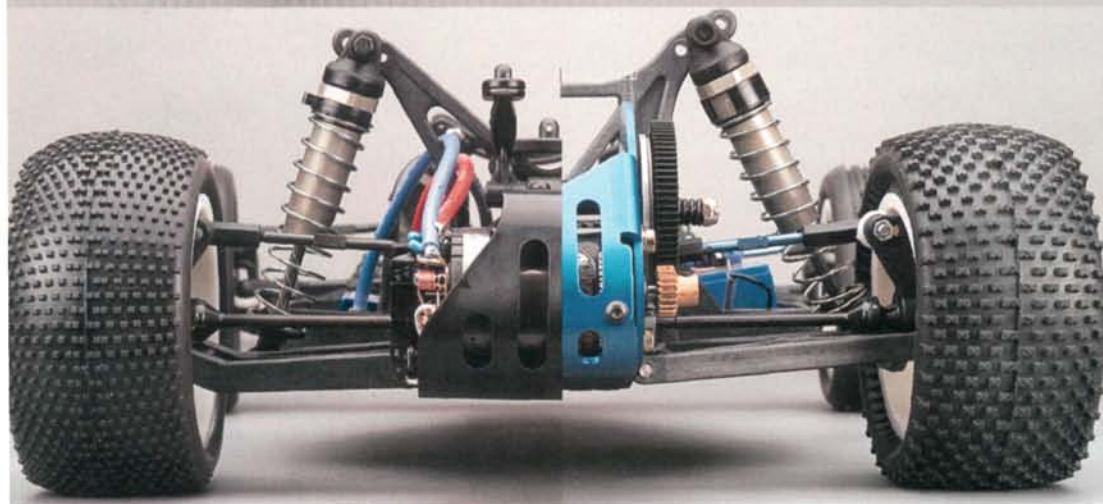
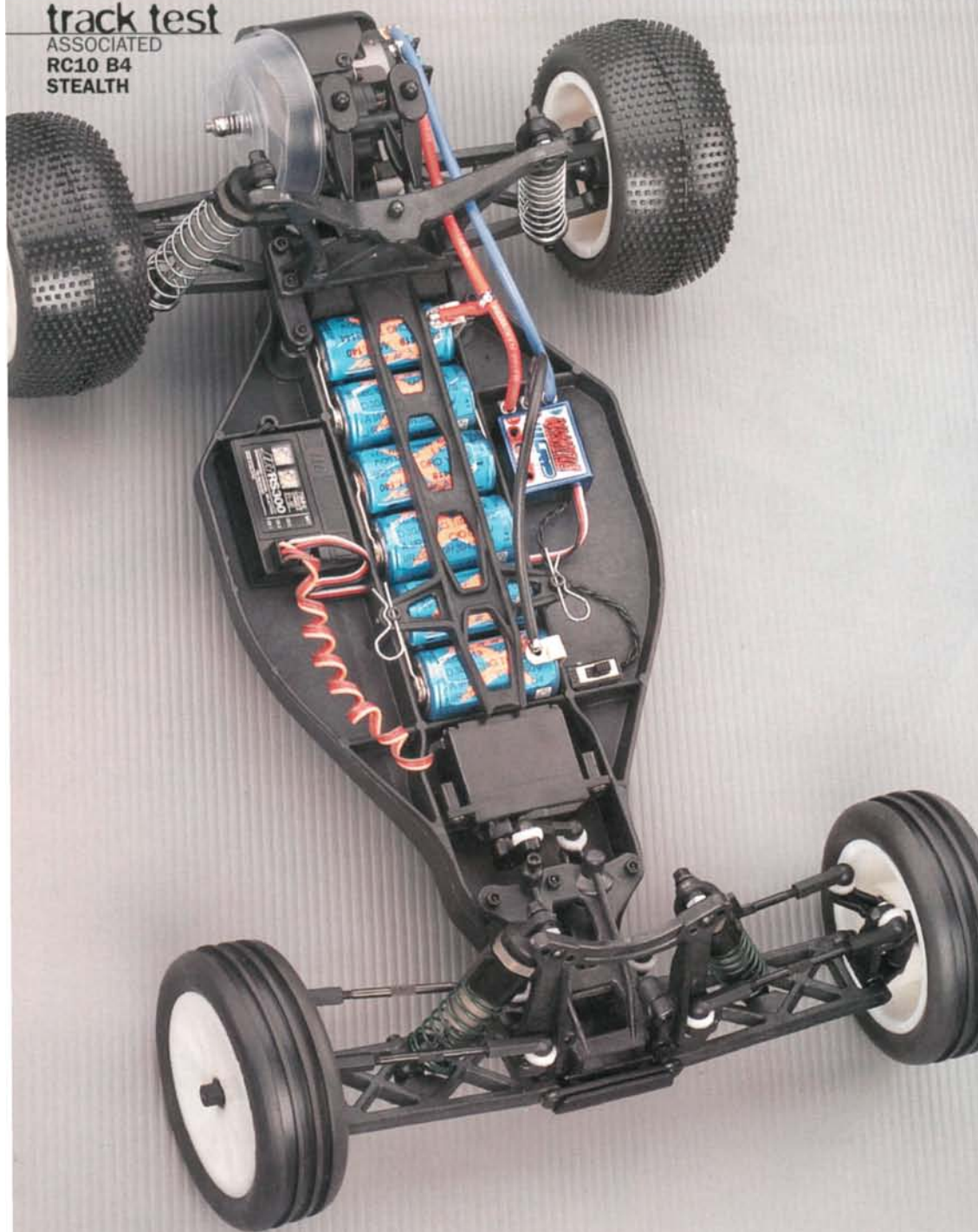


Killer B4

INTRODUCING SOMETHING BY SAYING IT "NEEDS NO INTRODUCTION" is pretty lame, but if there's one RC vehicle series that needs no introduction, the RC10 is it. Ever since the original, gold-tub RC10 set the standard for competition 2WD buggies in the mid-'80s, additions to the RC10 family have been highly anticipated RC events—and rare events at that. The aluminum-tub RC10 didn't see sweeping changes until the plastic-chassis B2 arrived in 1996. When the B3 hit tracks in 1998, it was a better car, but more evolutionary than revolutionary. The RC10 B4 Stealth, however, represents a totally new design for Team Associated—one that combines proven competition features with fresh ideas that belong to the B4 alone. We've all waited long enough for this car; let's drive it!

track test

ASSOCIATED
RC10 B4
STEALTH



DATA CENTER

VEHICLE TYPE 2WD electric competition buggy
BEST BUYER Electric off-road racers (or wannabes)
KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions Very good
Parts fit/finish Very good
Durability Very good
Overall performance Excellent

SPECIFICATIONS

MANUFACTURER Team Associated
MODEL RC10 B4 Stealth
SCALE 1/10
PRICE \$200

DIMENSIONS

Wheelbase 10.72 in. (272mm)
Width 9.9 in (251mm)

WEIGHT

Total, as tested 54.3 oz. (1,542g)

CHASSIS

Type Molded semi-tub
Material Composite plastic

DRIVETRAIN

Type 3-gear transmission
Primary Pinion (not included)/88-tooth spur gear
Transmission ratio 2.6:1
Drive shafts MIP CVD, steel
Differentials Ball type with steel outdrives
Bearing type Rubber-sealed
Slipper clutch Dual pad

SUSPENSION

Type Lower H-arm with turnbuckle camber link
Shocks Aluminum-body with clip-on preload spacers

WHEELS

Type 2.2-in. one-piece plastic

TIRES

Type (F/R) Pro-Line M3 wide-body 4-rib/Pro-Line M3 Holeshot

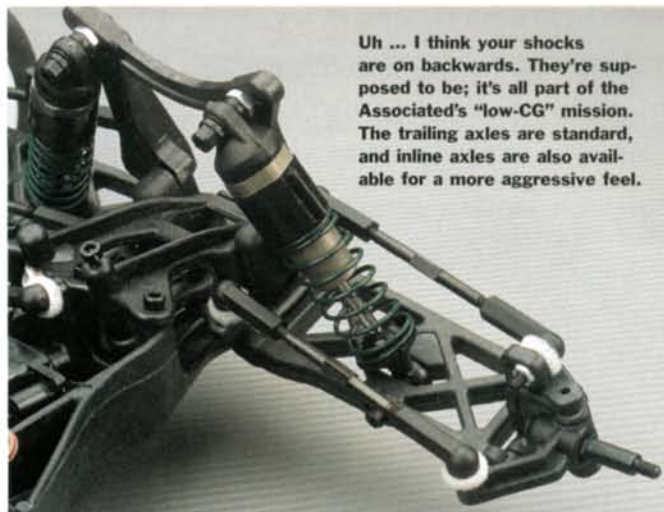
THE B4'S CHASSIS IS ULTRA-SLAMMED FOR A LOW CENTER OF GRAVITY

Left: the left half of this photo shows the B4; the right half shows the B3; both axles are on the same plane. Note how much lower the B4 is, both in terms of overall height (look at the shock towers) and the position of the parts (most notably, the "drooped" suspension arms). The B4 is slammed!

KIT FEATURES

CHASSIS. Like all the B buggies since the B2, the B4 uses a molded main chassis; but unlike its predecessors, the B4 does not have a separate, aluminum nose plate; instead, the front-suspension subassembly is bolted directly to the chassis' kicked-up nose. A separate rear section is still used, but it is now plastic instead of aluminum, and it has integrated arm mounts. The redesigned battery brace now has side-mounted attachment points that allow more room on the chassis for the steering servo, and the servo is easy to install and remove because no braces pass over it. The rest of the chassis is also very "clean," with only a few strategically placed gussets to stiffen it. Most of the chassis' rigidity comes from its relatively high walls and the battery-tray sills.

DRIVE TRAIN. The big news here is the addition of a larger differential, but it isn't really a new differential; it's the same diff as the RC10GT has used for years. The diff is larger (52 teeth versus 48), and thanks to its correspondingly larger diff rings and outdrives, it can handle more torque. The larger gear also raises the transmission ratio to 2.6:1, making it more mod-motor friendly. The tranny's counter gear and steel top shaft with integral top gear are carried over directly from the B3, but the B4 gets a new double-sided slipper clutch. The spur gear has a hexagonal recess on each side to hold the slipper pads, and the assembly is squeezed between a



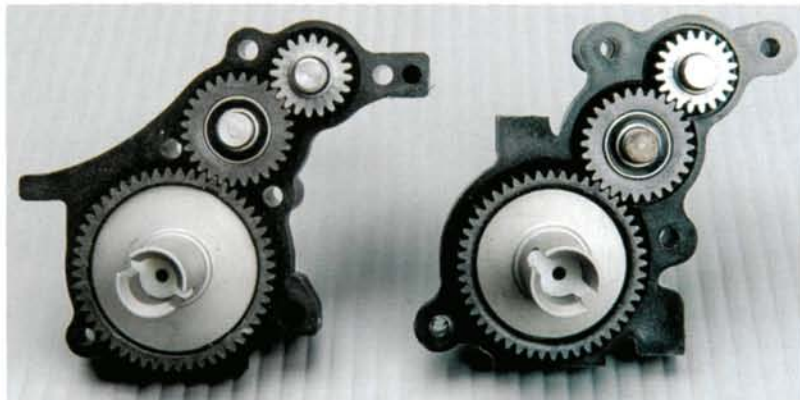
Uh ... I think your shocks are on backwards. They're supposed to be; it's all part of the Associated's "low-CG" mission. The trailing axles are standard, and inline axles are also available for a more aggressive feel.

pair of hard-anodized pressure plates. You can no longer swap spur gears without changing the slipper setting (as you could with the B3), but that's no biggie. What is a downer is the need for longtime Associated guys to get new spur gears; they'll get over it.

The motor plate is a new design and no longer folds over to protect the motor; a separate plastic part handles that chore and spares the motor plate from impacts. MIP CVDs remain the axles of choice, but they've been lengthened for B4 duty: 105mm from tip to tip—up from 90mm. Rubber-sealed ball bearings are the finishing touch.

SUSPENSION AND STEERING. Angled steering bellcranks are a new feature for the B4; they're tilted backwards to match the steering arms' caster angle. (But do you know which company had this feature first? Wrong. It was Schumacher.) Two Ackerman positions are available on the bellcranks, and a cam-type servo-saver is built into the system.

"Forward swept" front suspension arms are another new feature. The arms don't actually sweep forward, but they are swept backward far less than the B3's arms. The B4's arms appear to be mounted at a 90-degree angle relative to the chassis, but they are angled backward just slightly. According to Cliff Lett, the front suspension was designed in conjunction with the



The B4 tranny is on the left; that's a B3 tranny on the right. Note the B4's larger diff (borrowed from the RC10GT) and the lower top-shaft position that offsets the increased height of the GT diff.

BUILDING & SETUP TIPS

I've heard good reports from guys building B4s as their first kit-assembly experience, all thanks to Associated's lucid manual and precision-fit parts. For you seasoned wrenchers, getting the B4 together should be a cinch. But who doesn't like tips?

SILVER AND BLACK. Pay attention to the color of the ball ends shown throughout the manual; the parts legend shown with every step tells you whether the ball end to use is silver or black, but the part is always illustrated in the same gray tone. Ya gots to read; don't just look at the pics.

TURNBUCKLE ASSEMBLY. Before you start goofing up the turnbuckles and ball cups with pliers, reach for the molded tools included with the kit. One tool has a round, slotted end that you can use to hold the ball cups (it's also used for the shock caps), and the smaller wrench-type tool has a slot to hold the turnbuckle.

BAG B, STEPS 3 AND 4; BAG D, STEP 1; BAG E, STEP 6. In these steps, you install tiny 2-56 x 1/8-inch screws to capture the hinge pins. These do not have to be socked down! There's no load on the screws; they just prevent the hinge pins from sliding out. Once they've bottomed out on the arms, that's tight enough.

BAG B, STEP 6. Because there's very limited wrench-turning room, installing the ball ends in the front shock tower is difficult unless you have a thin-wall nut driver deep enough to fit over the ball end. You can make one by cutting the 4mm socket off a Tamiya four-way wrench (or a similar tool; you have one somewhere) and grinding a slot for a screwdriver in the back of the socket nub. Use your rotary tool and a cutoff wheel to cut and slot the four-way wrench.

BAG C, STEP 17. The slipper hubs should slide easily over the top shaft; if they fit tightly (as mine did), use a flat needle file to de-burr the flats on the slipper-hub shaft openings. It only takes a couple of passes to correct the fit.

YOU'LL NEED

- Transmitter and receiver
- Steering servo
- Electronic speed control
- Motor
- 6-cell battery
- Charger
- Tire glue
- Polycarbonate-compatible paint

FACTORY OPTIONS

- Blue titanium 2-in. turnbuckles (pair)—item no. 1406
- Rear swaybar kit (includes 3 bars)—9635
- Blue-anodized-aluminum shock caps (4)—1598
- Lightweight diff-outdrive set—1766
- Steering-rack bearings (4)—3971
- Unobtanium low-friction shock shafts (F/R)—6418/6417
- Caster blocks (pair; 20/30 deg.)—9592/9593
- Complete molded-graphite parts set—9655
- Inline steering blocks (pair)—9577
- Factory Team aluminum:
 - Motor plate—9600B
 - Wheel spacer—9608B
 - Hinge-pin brace—9616
 - Inline axle—9623

*Partial list; more options are available.

WHAT THE DRIVERS ARE SAYING

I polled B4 owners on the RC Zone bulletin board (check it out at rcreaction.com) and at rc10B4.com (featured this month in Racer News "Site Seeing") for their thoughts on the new car. Here's what they had to say:

I have raced my B4 a few times, and I am glad to see that Associated has kept the durability level up. I have had some incredible crashes, and the B4 has stayed together great.

Nelson Cabrera, Indianapolis, IN

I am truly impressed. I have been driving Team Losi kits for 10 years because I thought nothing could compare. This car is right on. Good job AE.

Keith Billanti, Amherst, NY

This is the best RC10 ever—more responsive and easier to drive than any buggies I've tried before.

The B4 will be the next 2WD world champion!

John Lara, Fetsund, Norway

I got my B4 on Friday, had it completely assembled in just eight hours (time out to eat dinner), entered my first off-road race on Saturday and placed third in the A-main behind two guys who have 15 and 18 years of racing. Not bad for a first-time driver! The B4 was so easily set up—even for a novice—and so right "out of the box."

Glenn R. Wemmer, Blanchard, OK

Fifteen years of racing Associated vehicles and, without a doubt, this is the best yet! Hope the T4 is quicker getting here!

Mark Smith, Farmington, MO

The B4 is the smoothest car I have ever raced, and I've been racing Associated cars for 14 years. Nothing compares. Nuff said.

Norman Skinner, Ayer, MA

Well worth the wait! I just love the B4; it's smooth, fast and easy to tune. You feel every adjustment you make, so you know you're tuning in the right direction. Jumps gracefully and power-slides the infield, and straightaway speeds are ballistic. The B4 is the one to watch—speed by you!

Joe MacDougall, East Meadow, NY

First time out, and stock from the box, this car was overtaking its finely tuned predecessors. All of the hype, all of the wait; it was well worth it. Associated delivered.

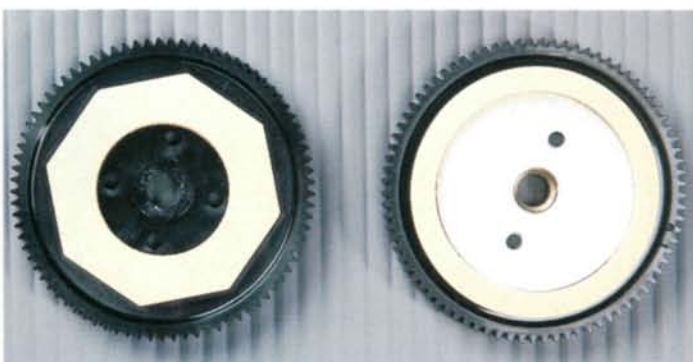
Bill Peters, North Brunswick, NJ

One awesome vehicle. The thing steers as well as my old B3 and is as stable as my Triple-X. Many more tuning options than the B3 and it really responds to setup changes. Another great addition to the legendary RC10 series.

Ron McLean, Federal Way, WA

Fine-tuned with phenomenal handling out of the box. Sets the standard for its successors. Unparalleled design with many upgrades available. Easy to drive fast!

Aaron Mathiason, Clovis, NM



Just one of the B4's slipper pads (left) has more surface area than the B3's single-pad setup (right), and the B4 sandwiches the spur gear between two slipper pads. Smoooooth.

angled steering bellcranks to provide maximum front-end clearance while minimizing bump-steer and maintaining correct Ackerman settings. Trailing front axles are standard, but inline axles (the axle is on the same plane as kingpin) are available as an option. The "quadra-symmetric" concept returns with the B4: all four arms are the same length and have equal hinge-pin spacing. Don't look for E-clips on these hinge pins though; instead, tiny button-head screws capture them.

Steel turnbuckles are standard, and they snap onto ball studs that are threaded vertically into the front shock tower and rear bulkhead. This makes it easy to adjust roll center by putting spacers under the ball studs. There are also two positions for each inboard ball stud for more setup flexibility. You'll also find two front and three rear camber-link positions on the hub carriers, and it's impossible to miss the Losi-style front camber-link placement. The links are mounted in front of the shock tower, but similarities to Losi's Triple-X end there. The B4 uses a molded front shock tower that holds the shocks behind the shock towers, as seen on the original "Stealth" prototype Masami Hirotsuka drove way back in 1991 when Associated first began testing concepts for the B2. Nice to see that the feature finally made it to production!

The rear suspension is also unique, if not in quite as showy a way. Viewed edge-wise, the arms looked kinked; there are sharp doglegs where the arms reach up to meet the hub carriers. This is done for drive-axle clearance because the chassis and transmission are very low relative to the suspension. It's all part of the low-CG mission.

The B4's shocks are the same Team spec units as have served Associated well for years. Hard-anodized aluminum bodies with Teflon-coated bores, solid Teflon pistons and shaft guides, clip-on preload spacers and bladder-less caps are used in an "emulsion" design; any air in the shock bodies is emulsified

It just wouldn't be a B4 buggy without MIP CVD axles. The B4's units are the longest ever in an Associated buggy.



(or mixed) with the shock fluid by the piston as it circulates the fluid.

BODY, WHEELS, AND TIRES. Pro-Line handled the B4's body design and came up with a very low-slung shell dubbed the "Interceptor." The wing is slammed as well, and it drops below the B4's molded wing supports. There are no more wing wires and buttons to hassle with, and the wing's angle can be adjusted by slipping wedge-shaped spacers under it. Josh Thiel handled the paint.

Pro-Line also supplies the B4's rubber. Holeshot LP (low-profile) rear tires and wide-body 4-rib front tires are standard, and they're a good match for the hard-packed surfaces favored by most tracks. New wheels give the tires a home. The front hoops have 4.7mm less offset than the Associated's previous wheels, and the rears have 8.8mm less. But that doesn't make the B4 narrower; those millimeters are taken up by the suspension, which reaches more deeply into the wheels. The faces of the steering hubs and rear hub carriers are now centered in the width of the wheels. This can only improve the response of the suspension system. As a bonus, the new rear-wheel offset makes the B4 compatible with Losi rear wheels, so you can buy whatever is on the hobby shop shelf and know it will fit, or you can freely "borrow" a set of sneakers from your buddy with a Triple-X (and by "borrow," I mean steal).



TEST GEAR

JR Racing XS-3 transmitter and RS300 receiver

JR's XS-3 is fast becoming my favorite radio. It has all the most important tuning features, an easy-to-navigate menu system and reliable FM operation, but the foolproof frequency-synthesizing system is the deal-maker. No more hanging around waiting for someone to hand over the clothespin with your channel written on it, and no more scrambling to settle frequency conflicts after the Mains have been posted; you can't beat that. I used the system's included Z590M servo to steer the B4.

Additional Items

- LRP Quantum Competition speed control
- Reedy/Yokomo 3300 matched pack
- Reedy Krypton motor, 10-double
- Robinson Racing Absolute 22-tooth pinion

PERFORMANCE

Along with the XRAY T1 Raycer I tested for this issue, the B4 made its first run along our office hallway so that I could set the steering trim, slipper clutch and differential. Full-throttle launches caused the diff to slip with a bark before the Reedy 10-turn motor lifted the front wheels off the ground. Instead of loosening the slipper, I tightened the diff. Even when set tightly enough to prevent slippage with a locked-down clutch, the diff operated very freely; Associated still makes the best diffs in the biz. In the quiet of the hallway, the whir of the B4's tranny was barely audible, and the car was hella fast; I couldn't wait to hit the dirt. I indulged myself with a few indoor wheelie runs before I packed up for the trip to Xtreme RC Raceway in Enfield, CT, where the real testing would go down.

Xtreme's freshly groomed track was set up for an East Coast-style workout. I knew the loose dirt over a relatively hard-packed base would be a good challenge for the car's hook-up abilities, and the highly technical layout of large and small jumps, switchback turns and good ol' ruts and bumps would certainly find any suspension shortcomings.

Before I could run the track at speed, I had to dial in the slipper

clutch to suit the loose surface. I loosened the adjusting nut a few turns for a good 3 feet of slip, and then I cranked it back down until I had just enough slip to take the edge off a freshly peaked pack during a hard launch at the start tone. The slipper clutch responds very well to fine adjustments, and get-

LIKES

- Best-handling B-car yet.
- No more wing-wire!
- Dual-pad slipper clutch outperforms previous designs.
- Excellent differential.
- Compatible with Team Losi rear wheels.

ting the setting just where I wanted it was easy. Once the battery had burned off its peak, the slipper was essentially locked, and the Holeshots tires moved a lot of soil as the B4 roosted from turn to turn. I was concerned that the B4's super-low stance (with the kit's stock settings) would lead to a lot of chassis slap going through the bumpy sections. But judged by the car's feel through the rough stuff and the chassis' light scuffing after testing, I'd say the B4 doesn't bottom out on the track any more than other buggies. The car definitely felt more sure-footed than the B3 ever did; lowering the car's CG and extending the suspension deeper into the wheels was, no doubt, the reason.

Initially, the B4 had too much steering for my liking, so I dialed up a little more front toe-in. If the track hadn't been quite as loose, the B4 probably would have been fine as it was. Even with the extra toe, it steered aggressively and really hunkered down in the corners with a



SQUIRTING THE B4 OVER JUMPS DIDN'T REQUIRE ANY THOUGHT AT ALL: JUST POINT AND SHOOT.

slight tendency to oversteer that made it easy to adjust my line with the throttle. It was easy to see that the B4 was getting around the track in a hurry, but it never felt as if it was being pushed hard. Obviously, there are limits to how fast you can go before it runs out of traction, but the B4 never sets off a panic alarm; you can feel it approaching its limits, but there aren't any surprises.

Squirting the B4 over jumps didn't require any thought at all: just point and shoot. I made a few off-camber passes to see how much I'd be able to upset the chassis, but it's a tough buggy to push out of shape. Landings were solid, too; as long as the B4 can put any of its wheels down before the hard parts hit the dirt, you should be able to roll out of anything short of landing upside-down.

DISLIKES

- Gear cover is kinda cheezy.
- Requires B4-specific spur gears.

THE VERDICT

The B4 Stealth is certainly the best buggy ever to roll out of Team Associated. It's easier to drive than the B3 and has a better-sorted suspension system that should be easier to adapt to suit all sorts of track conditions. It works well built straight from the instruction sheet, and thanks to its increased adjustability, shaving tenths off your lap times with additional chassis and suspension tweaks should be easier than ever before. And it doesn't hurt that the car just looks cool; with its new stance and razor-sharp body, it will look great on your mantel—with your trophies.

SOURCE GUIDE

LRP distributed by Team Associated.

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REEDY a division of Team Associated.

TEAM ASSOCIATED (714) 850-9342; teamassociated.com; rc10.com.

XRAY T1 Raycer



PHOTOS BY PETE HALL



PLASTIC FANTASTIC

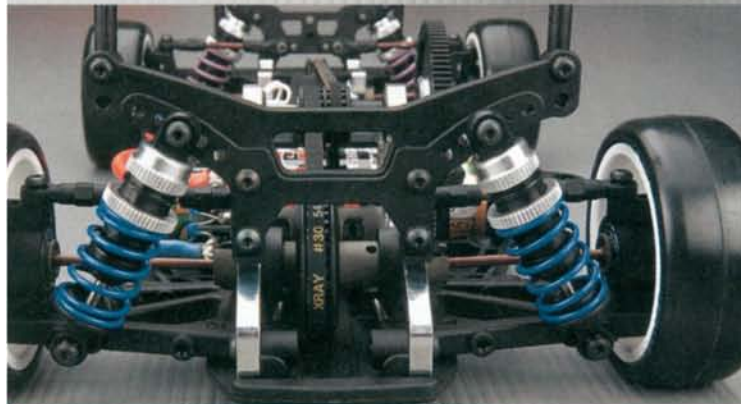
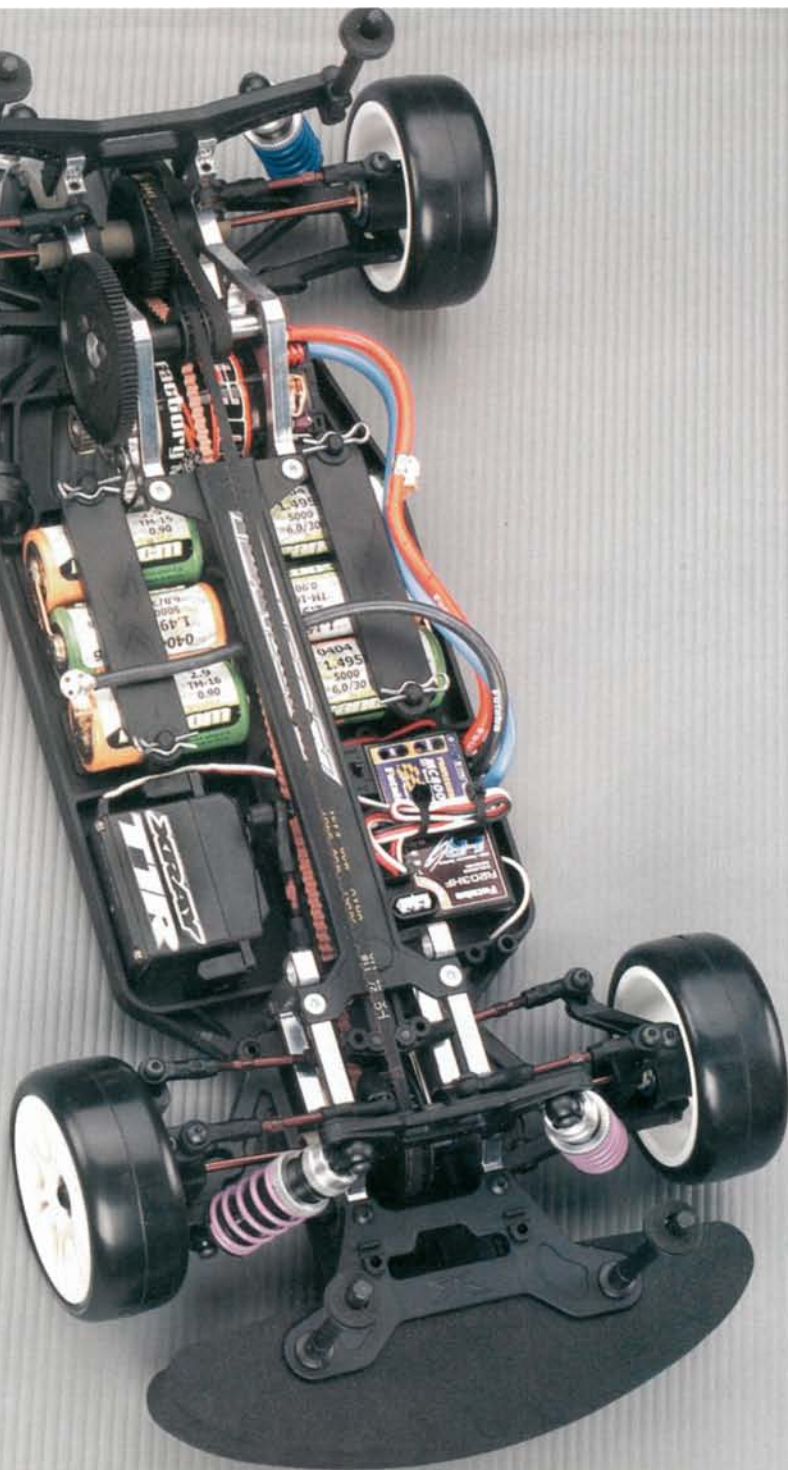
XRAY DIDN'T WASTE TIME ESTABLISHING A NAME FOR ITSELF as a maker of super-high-quality touring cars. When the original T1 was released, it was arguably the ultimate expression of the classic aluminum and carbon-fiber RC esthetic as well as a completely and easily adjustable racing platform. The T1 Evo 2 followed, and it put an even finer edge on the T1's performance and also ramped up the car's price. Now XRAY is launching the T1 Raycer (T1R); it's a lower-priced version of the T1-series platform that features a composite-plastic chassis in place of graphite plate parts. But don't call the Raycer a "sport" car; although it may cost less than an Evo 2, the Raycer is still a full-on, competition kit.

track test

XRAY T1 RACER

Bottom left: note the arched lineup of holes on the shock tower; changing the shock angle won't alter ride height. This angle also shows off the externally adjustable diff; to tighten or loosen it, just slip a hex key through the hole to lock the diff screw, then turn the left wheel.

Bottom right: the Raycer uses a conventional C-hub suspension system but with some clever features. The lower arms reach way back on the chassis to ward off arm-snapping impacts, and the arms are capped for additional rigidity. The shocks are trick, too; the damping can be adjusted externally.



THE MAIN CHASSIS IS CONSTRUCTED OF VERY RIGID COMPOSITE PLASTIC.

DATA CENTER

VEHICLE TYPE Electric 4WD competition touring car kit

BEST BUYER Touring car racers

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Excellent

Parts fit/finish Excellent

Durability Very good

Overall performance Very good

SPECIFICATIONS

MANUFACTURER Tamiya

MODEL TB Evolution

SCALE 1/10

PRICE \$225 (varies with dealer)

DIMENSIONS

Wheelbase 9.9 to 10.2 in. (252 to 261mm)

Width (F/R) 7.4 in. (189mm)

WEIGHT

Total, as tested 54 oz. (1,530g)

CHASSIS

Type Molded semi-tub

Material Plastic composite

DRIVE TRAIN

Type Dual belt

Primary 93T spur gear/pinion

Transmission ratio 2.125:1

Drive shafts Spring-steel shaft and jointed, hard-coated aluminum stub axle with integrated drive hex

Differentials Externally adjustable ball type; hard-coated aluminum outdrives with labyrinth seals

Bearing type Degreased, polyamide sealed bearings

SUSPENSION

Type Lower H-arm with turnbuckle camber link

Shocks Serpent threaded plastic-body, externally adjustable damping

WHEELS

Type One-piece 24mm split-spoke

TIRES

Not included

KIT FEATURES

CHASSIS. The T1R is the first XRAY car to use a molded chassis, and the design places an emphasis on balanced weight distribution. The motor is mounted on the chassis' centerline, and a saddle-pack configuration holds the cells as close to that centerline as possible while evenly splitting the weight of the cells. This allows space for the steering servo on the right side of the chassis counterbalanced by the receiver and speed control on the left.

The main chassis is molded as a single piece and is constructed of very rigid composite plastic. XRAY warns that the material is temperature-sensitive; a hot motor or battery won't harm the chassis, but leaving it in the trunk of your car all day long in August may distort it (so don't do that).

Battery slots and an opening for the motor allow those heavy components to hang low in the chassis, and a variety of gussets and ribs provide reinforcement. A channel beneath it provides a convenient place for optional bolt-on weights. The channel is also part of XRAY's "Inline Flow Cooling System" that is meant to channel cooling air to the motor and exhaust it through vents (which double as access ports for the wheelbase spacers) under the rear hinge pins. I don't expect to see icicles forming on



The Raycer chassis pops out of the box looking just like this. Are those bulkheads beautiful, or what? You'll have to remove them to finish assembling the car, but seeing the assembled parts sure gets you psyched to build. Notice the large bays in front of the battery slots; there's plenty of room for electronics.

the motor, but extra airflow can't hurt.

The molded chassis is cleverly designed, but it's the machined duraluminum bulkheads that will get all the attention in the pits. They're identical in configuration to the XRAY Evo 2's units but aren't hard-anodized; instead, the T1R's parts get a chrome-like, polished finish. Don't worry about the missing hard coat; duraluminum is a harder alloy than plain 6061 billet, and there's plenty of material in the bulkheads.

DRIVE TRAIN. The T1R's drive train uses the classic 2-belt, dual ball-differential configuration. The diffs have lightweight, hard-anodized aluminum outdrives with factory-assembled thrust bearings that are captured within the outdrives by C-clips. The diff rings are hardened 1.5mm steel with machined surfaces, and plastic dust covers are snapped over the diff pulleys to seal out grit. Instead of a contact seal (which would add drag), a "labyrinth" seal is used. Fancy word, simple concept: dirt may get past the diff cover where it meets the outdrive, but concentric rings within the cover prevent the grit from going any farther simply by making the path circuitous, hence the name "labyrinth." The diffs are secured in the bulkheads by plastic holders with offset bearing cups. Belt tension is adjusted by rotating the holders in the bulkheads, which are



The channel beneath the chassis, the large motor opening and the "exhaust vents" are all part of the Raycer's "Inline Flow Cooling System." The channel is also a handy spot for XRAY's trick, bolt-in chassis weights.

BUILDING & SETUP TIPS

The T1R is easy to build, thanks to the precise fit of the kit's parts and the excellent, full-color assembly manual—not to mention the included setup book, which explains the chassis adjustments and what their effects are on handling. Pay a little extra attention to the following, and you're guaranteed to have a good build.

DIFF-BEARING HOLDER INSTALLATION. Double-check the position of the holders and the orientation of the bulkheads before you install them; the manual's illustration is correct, but it's easy to assemble the parts backward if you aren't paying attention.

HINGE-PIN SPACERS. The T1R's wheelbase is adjusted by sliding the rear arms fore and aft on the hinge pins, but the tubular spacers that position the arms can only be removed with much disassembly. Instead of installing the tubular spacers, use the clip-on spacers that are included in the spare-parts bag; they can be removed and reinstalled without disassembly.

HINGE-PIN SETSCREWS. The hub carriers' hinge pins have flat spots ground into them to accommodate setscrews that are threaded into the hub carriers. Thread the setscrews in until they gently bottom out on the hinge pins; you don't have to tighten them against the hinge pins.

BELLCRANK ASSEMBLY. Don't forget to install the spacers under the bellcrank's ball studs; if you install the ball studs without the spacers, the steering tie rods will hit the bellcrank and reduce front suspension travel.

FRONT ARM MOUNTS. The illustration is numbered incorrectly; the correct locations for the arm mounts are left front: 3; left rear: 2; right front: 2; right rear: 3.

SHOCK ASSEMBLY. The seal caps are difficult to grip with bare fingers. Pad the jaws of your pliers with a wide rubber band to twist them more easily, or use Hudy's shock assembly tool (item no. 183010).

YOU'LL NEED

- 190mm body
- Transmitter and receiver
- Electronic speed control
- Steering servo
- Motor
- Pinion gear
- 6-cell saddle-pack battery
- Charger
- Tires
- Tire glue

FACTORY OPTIONS

- Aluminum C-hub suspension—item no. 30 0901
 - 6-cell graphite chassis—30 1110
 - Ultra-flexible top deck—30 1170
 - Ultra-tune graphite front shock tower—30 2093
 - Swaybar set—30 2400
 - One-way differential pro set—30 5101
 - Spring-steel stub axle—30 5315/pair
 - Teflon-coated-aluminum shock bodies—30 8320/set of 4
- *Partial list; many more options available

indexed to hold the settings.

Spring-steel drive shafts with rebuildable, CV-style joints are found at all four corners. The shafts end in hard-anodized duraluminum stub axles unlike the usual touring-car components. Instead of the typical 5mm stub axles with a crosspin and separate drive hex, the T1R has massive, hollow 10mm stub axles with drive hexes machined right in. The XRAY "True Hex" design is completely wobble-free, and thanks to large 10x15mm bearings, there's no detectable play.

The dogbone ends of the shafts are fitted with plastic yokes to prevent steel-on-aluminum contact with the diff outdrives. To make sure that everything spins freely, the kit's ball bearings are degreased and lubricated with AeroShell Fluid 12 (a special aircraft lube). Blue polyamide seals keep the fluid in the bearings, and they seal with less friction than rubber or Teflon seals.

SUSPENSION AND STEERING.

Since the original T1, all XRAY cars have included Serpent shocks with threaded plastic bodies and externally adjustable damping. Two-piece pistons are the heart of the system. When the shock shaft is pulled to full extension, the lower piston half keys into the shock body and holds it in place. The top half of the piston is fixed to the shock shaft and rotates with it when the shock eyelet is turned. Depending on the direction you turn the eyelet, this blocks or reveals holes in the piston for more or less damping. Sharp detents make the settings clear, and four settings are available. Not for you? XRAY also includes conventional one-piece pistons with two, three and four holes.

The shocks are part of a fully adjustable C-hub suspension system with H-arms and turnbuckle camber links instead of the pivot-ball setup used on the T1 and Evo 2. Many competition touring cars are as adjustable as the T1R, but few are as easy to adjust. Without disassembling anything, you can set the front arm kick-up (or



XRAY assembles the thrust bearings for you, and the parts are captured in the outdrive with a snap ring; no more chasing itty-bitty thrust balls every time you take the diff apart.



The Raycer's hex hubs are machined directly into the stub axles, so they run perfectly true. The oversize bearings reduce play as well, and they contribute to the car's precision feel.



Top right: hard-anodized aluminum outdrives, thick ground-steel rings and labyrinth-seal pulley covers give the Raycer exceptional diff action, which, by the way, is externally adjustable without disassembly. Nice.

"anti-dive"), camber, front toe-in, anti-squat, arm droop and spring pre-load. Wheelbase is also adjustable in a 9mm range, albeit with some disassembly; but if you make a slight mod as you build (see "Building and Setup Tips"), you can adjust the wheelbase without disassembly. Naturally, there are shock-position options as well: five rear upper and three front upper positions are matched with two lower positions on each arm.

Instead of the usual dual bellcranks, the T1R is steered by a single ball-bearing bellcrank with an integrated cam-type servo-saver. There are two Ackerman positions on the bellcrank and steering arms, and spring-steel turnbuckles are used throughout—including the servo-to-bellcrank linkage.

BODY, WHEELS AND TIRES. Like many competition touring cars, the T1 Raycer does not include tires and tire inserts. But it does include wheels: zero-offset 12-spokers that look sort of like Pro-Line's Gumby design. The 24mm-wide wheels are molded of an exceptionally stiff plastic—all the better to get maximum grip out of your soft, low-profile racing rubber. I installed Take-Off 27-compound tires with medium inserts.

You'll also have to add a 190mm body to your shopping list; I went with a Pro-Line Crowd Pleazer painted by Josh Thiel. The T1R's body posts hold it snugly, thanks to the foam-padded "foot" on each post. The feet pivot to match the angles of the hood and rear window for a rattle-free fit.

THE COMPETITION

	CHASSIS	DRIVE SYSTEM	FRONT DIFF/ ONE-WAY	SUSPENSION	SHOCKS	BALL BEARINGS	PRICE**	TESTED
Academy STR-4 Pro	Graphite plate	Shaft	Ball diff	Hinge pin	Threaded aluminum	Metal-shielded	\$220	11/01
Associated TC3 Racer	Composite plastic	Shaft	Ball diff	Hinge pin	Plastic	Rubber-sealed	\$170	2/00
Tamiya TA04 Pro	Fiberglass plate	2-belt	Ball diff	Hinge pin	Plastic	Rubber-sealed	\$220	12/00
Team Losi Triple-XS	Composite plastic	Single belt	Ball diff	Hinge pin	Aluminum	Teflon-sealed	\$220	10/01
Schumacher Mission	S1 woven-composite plate	2-belt	Ball diff	Kingpin	Aluminum	Metal-shielded	\$200	5/02
Yokomo MR4 Pro SE	Composite plastic	2-belt	One-way	Hinge pin	Threaded aluminum	Rubber-sealed	\$400	4/01
XRay T1 Raycer	Composite plastic	2-belt	Ball diff	Hinge pin	Threaded plastic	Polyamide-sealed	\$225	7/03

*Partial list; category is too large to list all competitive vehicles **Price varies with dealer.

PERFORMANCE

An office hallway is hardly the place to test a competition touring car with a 10-turn motor, but this is nonetheless where the Raycer made its maiden voyage—strictly for servo-trimming purposes, of course. After clicking the 3PK's steering sub-trim for hands-off straight tracking, I couldn't resist giving the trigger a little squirt. Unsurprisingly, the unscuffed, shiny-new Take Off tires had no traction on the polyester carpet, and all four wheels spun as if the car was parked on a stand. What was surprising was that the Raycer still tracked straight and true, even with all four tires lit up. Sure, I built the car carefully to spec, but anytime a car rolls off the bench this tweak-free, I'm impressed.

Time for real-world testing. On blacktop, the Raycer accelerated as if it had a JATO booster strapped to its trunk lid and seemed to reach its top speed instantaneously (sorry, nitro guys; you might be able to go faster, but for sheer acceleration, nothing beats batteries). Thank Fantom power and the traction of sauced-and-heated rubber for the mad rip, but the car's dual-belt drive train deserves props for getting the power into the tires with seemingly zero friction and no hint of belt skip.

Bending the T1R into decreasing-radius turns revealed very slight understeer (aka push). The Raycer's push was very mild, so I decided to try to tune it out by reducing the amount of front toe-in. I dialed out about 1/2 degree of toe-in, and the push just about vanished.

Just about every roadcourse track calls for a lot of quick transitional moves to snake through chicanes or set up for a tight hairpin, and in these situations, the Raycer zigged and zagged with a lot of grip yet carried plenty of speed. My inner physics geek says it's because of the centered motor and saddle-pack cells. With these heavy components packed tightly around the car's center of gravity, the Raycer has a lower polar moment of inertia than cars with all their cells placed on one side of the chassis, and it can therefore change directions without bleeding off a lot of energy—I guess. Whatever the reason, this car can left-right-left-right as quickly as you can yank the steering wheel.

After dumping the Fantom GP3300 pack through the car a few times, I checked the car for wear and tear. The ball ends picked up a tick of play, the chassis caught some scuffs, and the belts loosened up a bit. The belts' tightness can be adjusted, but only with a fair amount of wrenching to remove the bulkheads. Since the belts weren't skipping, I decided to put off tightening them until the diffs needed rebuilding (or the belts start skipping; whichever comes first).

LIKES

- Super-high-quality materials and workmanship.
- Excellent box-stock handling.
- Very easy to tune and adjust.
- Damping and diff action are externally adjustable.

DISLIKES

- Chassis accepts saddle packs only.

THE VERDICT

Forget any notions you might have that the T1 Raycer is somehow "less than" XRAY's glitzier graphite cars. This plastic-chassis machine is 100-percent racecar, and it's a fine example of just how right the classic dual-belt/saddle-pack chassis layout still is. Unfortunately, the saddles do make swapping packs less convenient than with the more fashionable all-batteries-on-one-side layouts, but that's the price you pay for performance. And look at the bright side: since today's NiMH packs like to run more than once a day, you can just leave the pack in the car.

The Raycer is fast straight from the bench, and because the chassis and suspension adjustments are easily accessible, changing the setup to suit your track, horsepower and traction should be easy (especially when you consult the included setup guide). The high-quality materials and exceptional fit and finish are bonuses that make the Raycer a pleasure to wrench on and a car worthy of display as RC artwork. A pretty car that's pretty fast; there's a good combo.

SOURCE GUIDE

FANTOM RACING (269) 649-9583; fantom-motors.com.

FUTABA distributed by exclusively by Hobbico/Great Planes Model Distributors Co. (217) 398-8970; futaba-rc.com.

HUDY SPECIAL PRODUCTS distributed by Serpent USA; hudy.net.

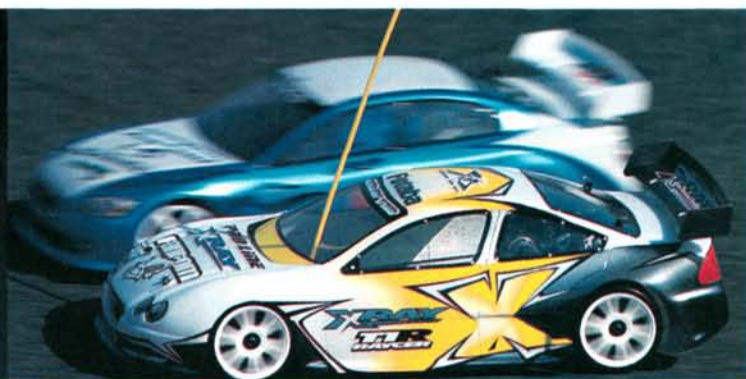
PRO-LINE (909) 849-9781; pro-lineracing.com.

ROBINSON RACING PRODUCTS (209) 966-2465; robinsonracing.com.

SERPENT USA (305) 639-9665; serpent.com.

TAKE-OFF distributed by Schumacher USA (813) 889-9691; racing-cars.com.

XRAY MODEL RACING CARS distributed by Serpent Inc. USA; teamxray.com.



ANYTIME A CAR ROLLS OFF THE BENCH THIS TWEAK-FREE, I'M IMPRESSED.

Futaba 3PK transmitter and R203HF receiver

Testing the XRAY gave me a chance to try out Futaba's new 3PK super radio, and it's a great improvement over the 3PJ in terms of ease of use. This radio is the first to feature Futaba's High-Response System (HRS). When paired with the R203HF receiver and a digital servo, the HRS mode allows the system to operate at a faster frame rate for lightening-quick servo response. Will you be able to feel a difference? That depends on your driving skill, but the T1R sure felt quick at the wheel to me.



Additional items used to complete the XRAY T1R Raycer:

Futaba S9450 digital steering servo

Futaba MC800C speed control

Fantom Killer Voltz GP3300 matched cells

Fantom Factory Modified 10-double motor

Robinson Absolute Pro pinion, 23 tooth

Pro-Line Crowd Pleazer 190mm body (painted by Josh Thiel)

Take-Off 27-compound tires with medium inserts

Bergonzoni Dominator Competition



PHOTOS BY PETE HALL

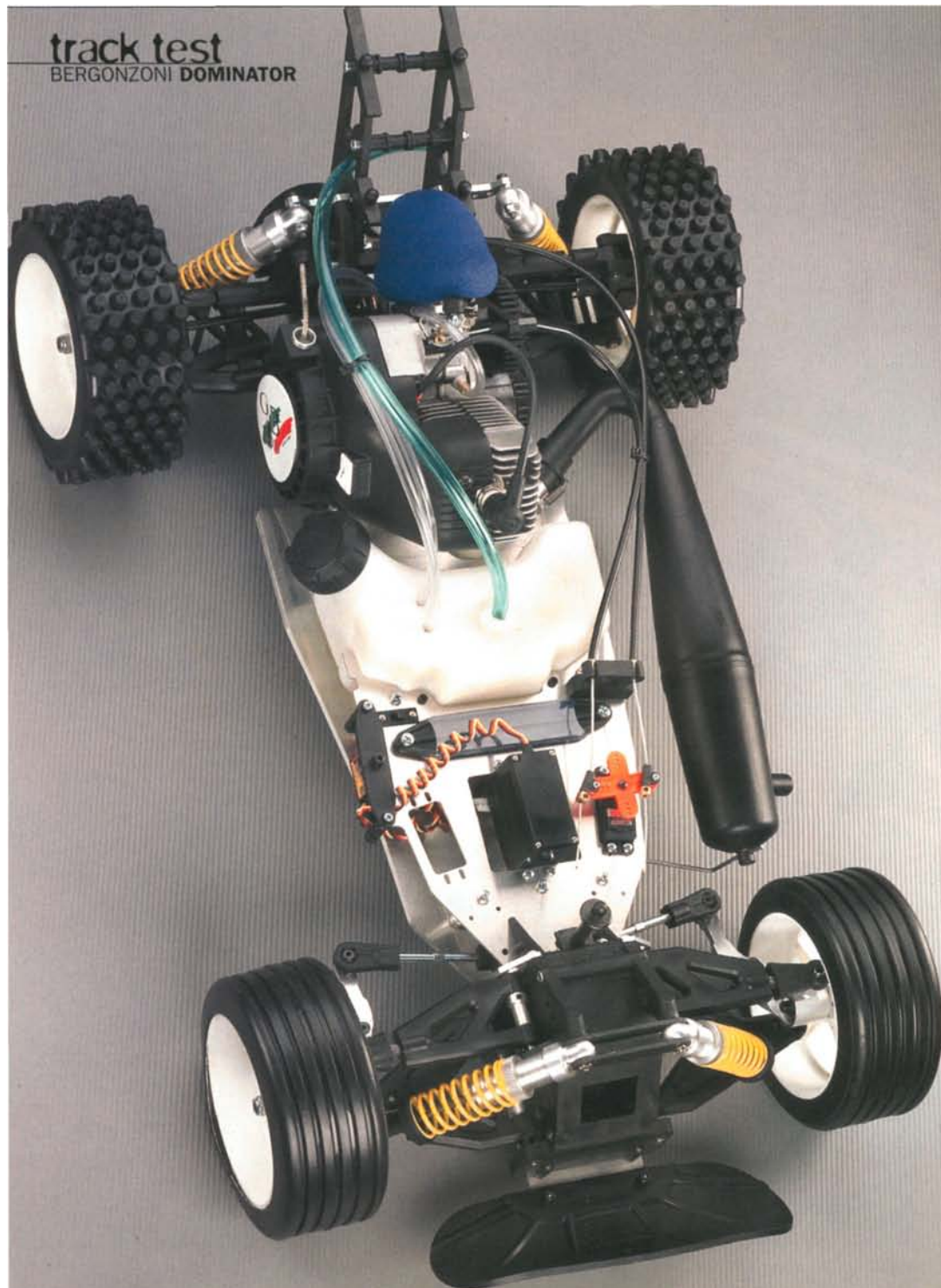


Big gas-burnin' buggy

GAS-BURNING, "WEED-WACKER"-POWERED $\frac{1}{6}$ -SCALE CAR are usually road-going affairs, but pounding pavement isn't the only way to "go big." Take a look at this $\frac{1}{6}$ -scale Bergonzoni Dominator, for example; there's no mistaking this refugee from a "Mad Max" movie for anything less than a hardcore off-road machine! With wheels the size of dinner plates, an exhaust pipe as big as a bowling pin and 23cc of unleaded-burning engine under the hood, the big Bergonzoni looks like a perfect ride for the backyard or BMX track.

track test

BERGONZONI DOMINATOR



DATA CENTER

VEHICLE TYPE 1/6-scale off-road buggy

BEST BUYER Anyone who wants the biggest, baddest buggy in the neighborhood

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Good

Parts and finish Very good

Durability Good

Performance overall Good

SPECIFICATIONS

MANUFACTURER Bergonzoni

MODEL Dominator Competition

DISTRIBUTED BY Blackhawk RC

SCALE 1/6

STREET PRICE \$1,079

DIMENSIONS

Wheelbase 18.75 in. (476mm)

Width (F/R) 17.2 in. (437mm)

WEIGHT

Total, as tested 21 lbs, 4 oz. (9,643g)

CHASSIS

Type Double-deck plate

Material 3mm aluminum chassis/
2mm aluminum upper deck

DRIVE TRAIN

Type Exposed gearbox

Primary 24-tooth clutch bell/
42-tooth spur gear

Transmission ratio 3:1

Final drive ratio 5.25:1

Drive shafts Dogbone

Differentials (F/R) Bevel gear

Bearing type Metal-shielded ball bearings

SUSPENSION

Type (F/R) King pin/H-arm with
camber link

Shocks Threaded-aluminum body
with O-ring seal

WHEELS

Type One-piece 5-spoke

Tires F/R Ribbed/multi-spike

Left: the Dominator's upper deck is constructed of 2mm-thick aluminum plate. There aren't any holes for the steering servo; when you've chosen the servo that you'll use, drill holes to suit it.

Right: the 23cc Boss engine is mounted at an angle to keep the buggy's center of gravity as low as it can be. The exhaust exits through a tuned pipe, and the header has a couple of tight bends that allow it to clear the engine.

AT 30.5 INCHES FROM BUMPER TO BUMPER, THIS THING IS HUGE!

KIT FEATURES

CHASSIS. The Dominator has a 3mm-thick aluminum-plate chassis. All the holes on the bottom have been countersunk to prevent the screws from rubbing on the ground, and the sides are radiused to increase overall rigidity. A machined recess underneath the diff makes room for the drive gear. Machined-aluminum bulkheads grace the front and rear, and a 2mm-thick aluminum radio tray in the front doubles as chassis stiffener.

DRIVE TRAIN. A steel clutch bell that houses a 2-shoe centrifugal clutch meshes with a plastic spur gear on the top shaft. Another plastic gear on the top shaft meshes with the diff gear. The gears are plastic, but they're wide, and the teeth are quite large, so they don't have any trouble handling the power of the engine. The diff housing contains a bevel-gear-type diff. Steel dogbones spin the rear wheels while a single disc brake keyed to the diff slows the big car down.

I don't like the drive-train gears being exposed to the elements. That may be fine for a sedan that runs on pavement, but this thing was designed for dirt! If one rock gets into the gears, they'll be history. Use caution if you run on gravelly surfaces.

ENGINE AND ACCESSORIES. A 23cc Boss engine is the driving force behind the Dominator. It features a heavy-duty pull-starter unit, a 2-needle carb, a finned heat-sink head, a throttle-return spring and a kill switch. It's mounted at an angle to fit the body and lower the buggy's center of gravity. The carb is connected to the servo by a long steel cable, and a tuned pipe enhances engine performance. Strong springs keep the pipe and header securely fastened in place. A plastic primer bulb pumps gas into the carb, but part of the left rear bulkhead is so close to the bulb that it actually pushes half of the bulb down, and engine vibration may cause it to damage the bulb. When it's time to remove the engine for maintenance, I'll trim the bulkhead for clearance. The pull-starter cord is at the rear to make it easier to start the engine with the body on. The engine runs on gasoline—not the nitro used in 1/8- and 1/10-scale vehicles. Refilling the tank is gonna be a little easier on your wallet. Gasoline



doesn't have any of the lubricants required to keep a 2-stroke engine running properly, though, so before you fill the tank, you must mix 2-stroke oil with the gas in a 25:1 gas:oil ratio.

SUSPENSION AND STEERING

The Dominator has long-arm independent suspension on all corners—double A-arm suspension up front and lower H-arms with upper links in the rear. Turnbuckles in the rear arms allow easy rear-toe adjustments. Long, aluminum, oil-filled shocks provide the big car with all the damping it needs; 146mm front and 152mm rear shocks do the damping, and the shock bodies are threaded for fine ride-height adjustments. You'll need a single 1/4-scale servo to operate the single bellcrank/servo-saver that handles the steering, and adjustable turnbuckles make camber and front toe changes easy.



The Dominator's independent front suspension is similar to the suspension on smaller RC cars. Long, coil-over, threaded-aluminum shocks provide the damping. Adjustable turnbuckles allow you to adjust toe and camber easily.

BODY, WHEELS AND TIRES. The Dominator's thick Lexan body and wing are difficult to trim in some areas, but the extra thickness is a must for a big buggy body. We shipped ours to Bill Zegers, who took care of the paint job. Stiff multi-spoke tires provide forward traction, and flat-carass ribbed tries do the steering. The tires are glued to 111mm 5-spoke wheels.

BUILDING & SETUP TIPS

The Dominator is sold 80 percent assembled, so there isn't much for you to do to get it up and running. Here are a few tips to help you finish the car better.

- 1. WASHERS UNDER THE RADIO TRAY.** The bottom of the receiver pack that was included with our test buggy rubs the bottom of the chassis when it's bolted into place. Engine vibration will eventually cause the dirt that gets trapped underneath the battery pack to work its way through the shrink-wrap. When that happens, the battery bars may short out the battery. Install a few washers between the battery mount and the radio tray to enlarge the space between the battery and the chassis.
- 2. STEERING-SERVO MOUNT.** There aren't any holes in the radio tray for the steering servo, so you have to drill them yourself. Measure twice and drill once; you only have one shot at getting the holes in the right locations!
- 3. CHASSIS PREP.** The edges of the chassis are very sharp; to avoid cutting your fingers on them, file them smooth.
- 4. GAS PREP.** Remember, this isn't a nitro car. To fuel it, you must use gasoline mixed with 2-stroke lubricating oil, better known as "premix." We recommend that you run a 25:1 mixture (premix is available at most hardware stores, but if you want the best blend, go to your local motorcycle shop and buy high-quality 2-stroke premix).

YOU'LL NEED

- 1/4-scale servo
- High-torque servo of standard size
- 2-channel radio
- High-capacity receiver pack
- 2-stroke oil
- Gasoline
- Polycarbonate paint

FACTORY OPTIONS

- Differential modular system—Item no. D20910279
- Aluminum front hubs—D20910288
- Plastic gear Z48—D20910063
- Steel clutch bell—D209330003
- VW Beetle wing body support D20930024
- VW Beetle ABS body—D20930025

PERFORMANCE

While working at *RC Car Action*, I have run a few 1/5-scale cars, and they were all a total blast to drive. I imagined that going off-road with one would be great.

The pull-starter-cord's location made it a little difficult to start the engine. The starter is at an awkward 90-degree angle that causes the cord to bind on the starter housing. I tugged the cord unsuccessfully for what felt like forever, but the carb-needle settings were slightly off; after I set the low- and high-speed needles to about 1 1/2 turns out, the engine roared to life. I gave it a minute to warm up, and then I grabbed a handful of throttle. Gas engines don't rev like nitro engines; they take a little longer to spool up, and the clutch engages later. I expected the Dominator to be slow because of this (and its weight), but it accelerated much better than I expected it to; I'd compare it to an 1/8-scale monster truck.

LIKES

- Long run times.
- Pump gas is cheap, compared to nitro fuel.
- Big!

Go-power was good, but braking power was almost nonexistent. The Dominator has only one disc brake, and that isn't enough. Don't get me wrong; the brakes worked, but it took a while for them to bring the big car to a stop. I saved full-throttle for areas with plenty of runoff. When you're behind the wheel of 20 pounds worth of gas-burning buggy, hitting stuff is not an option!

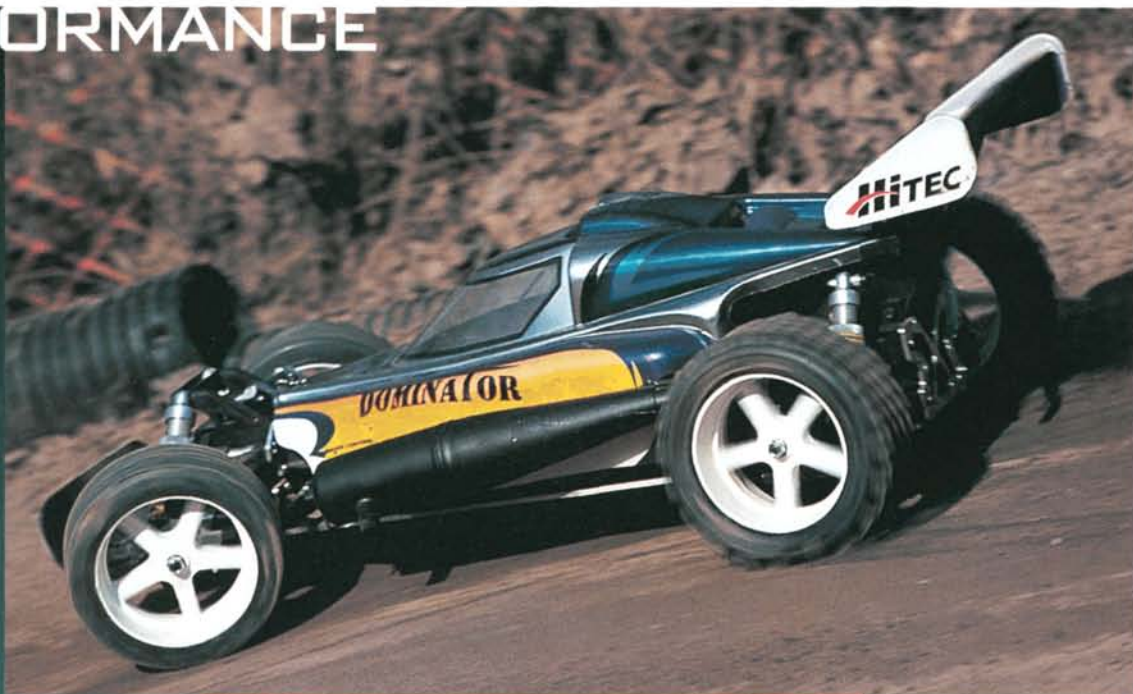
I think that the suspension is a little under-damped for the buggy's weight; it did OK on the small bumps, but larger ones threw the buggy's rear end around a little too much. Thicker oil will slow the shock action and smooth out the ride. Jumping this big

car is fun. It's so cool to see a buggy this big and heavy fly through the air; you can really sense all the mass in motion. It jumps just as high and as far as a smaller buggy, but its sheer size makes you enjoy this air time much more. Landings were a little rough, though. The chassisbottomed out on the dirt on every landing, but as I said, thicker oil in the shocks will help here.

I expected the steering to be very sluggish, but I was surprised: the big ribbed front tires and large steering servo do a good job, and the Dominator went through turns like a 1/10-scale buggy. It was also easy to correct skids, thanks to the steering system's quick response. A servo-saver is built into the steering system, but I think it's a little too stiff. All that bouncing around makes it hard for the steering servo to keep the front tires pointing in the right direction, and the servo-saver didn't do a good job of protecting the servo. I blew out a plastic servo horn, so I highly recommend that you invest in an aluminum horn if you get a Dominator of your own.

THE VERDICT

Unlike its on-road 1/5-scale counterparts, the Dominator can go just about anywhere and certainly looks impressive getting there. With its massive dimensions and throaty exhaust note, you'll definitely stand out at the local off-road RC hot spot. I'm a little disappointed that the gears aren't covered well enough to protect them from all the debris the buggy throws around; after all, it will see a lot of dirt time. You can easily make dirt shields with creatively cut Lexan, though. If you ever get the chance to try out a big-scale, gas-burning machine, make sure you grab the wheel. For sheer fun and "something different" appeal, you can't beat "going big."



IT'S SO COOL TO SEE A BUGGY THIS BIG FLY THROUGH THE AIR.

Hitec Lynx 3D radio

The Aggressor CRX is Hitec's new flagship system, but there's still a lot to like about the Lynx 3D—especially if you run the Spectra frequency-synthesizing module, which eliminates the need for transmitter crystals. I paired the Lynx with Hitec's DCX dual-conversion receiver, which is exceptionally glitch-resistant. The last thing I want is to lose control of a 20-pound car!

Hitec DCX receiver

Hitec HS-645MG throttle/brake servo

Hitec HS-705MG steering servo

DISLIKES

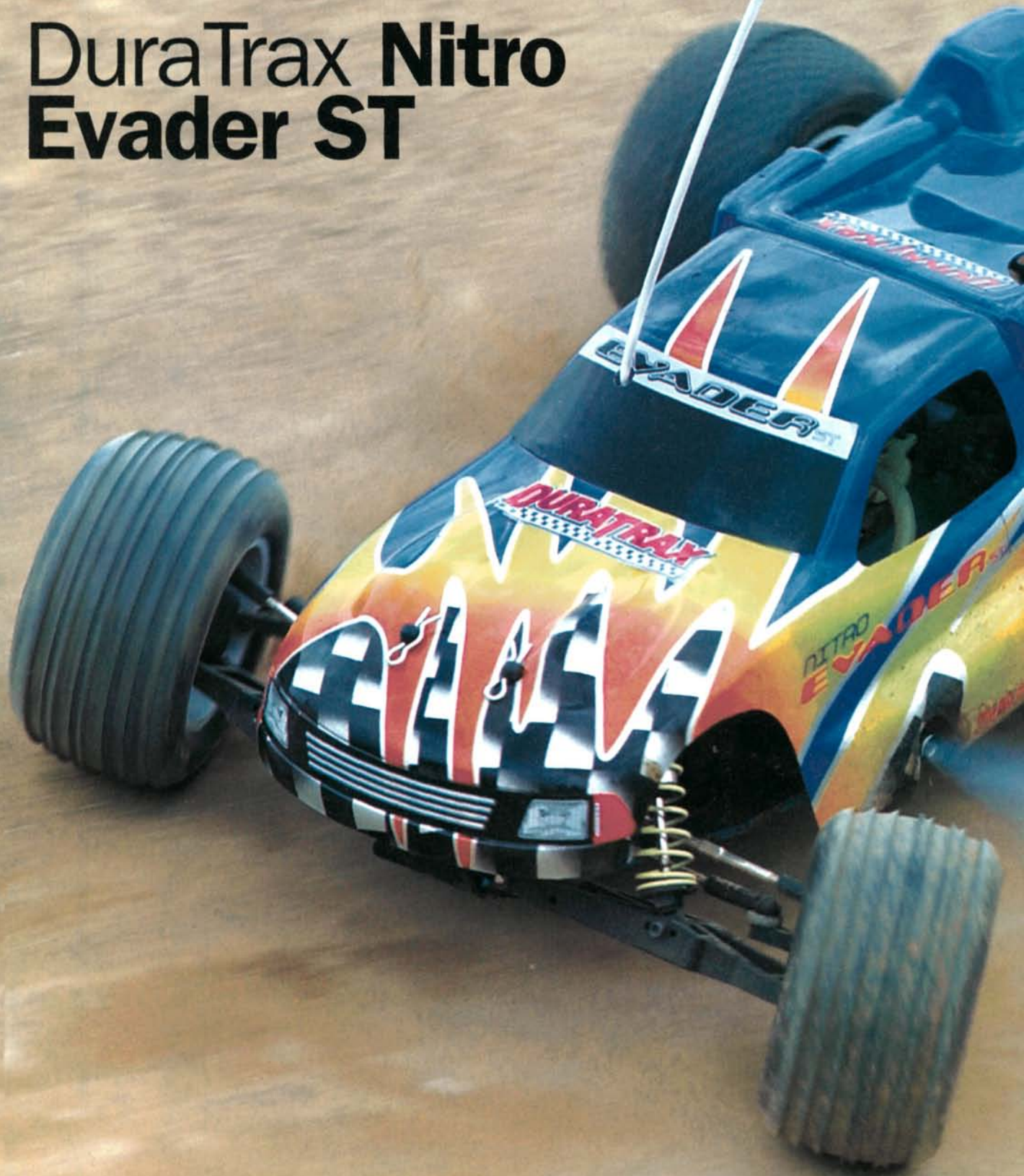
- Exposed drive train could be prone to damage.
- Single disc brake lacks sufficient stopping power.
- Primer bulb hits rear bulkhead.

SOURCE GUIDE

BERGONZONI RC distributed by Blackhawk RC (503) 816-8343; blackhawkrc.com.

HITEC RCD (858) 748-6948; hitecrco.com.

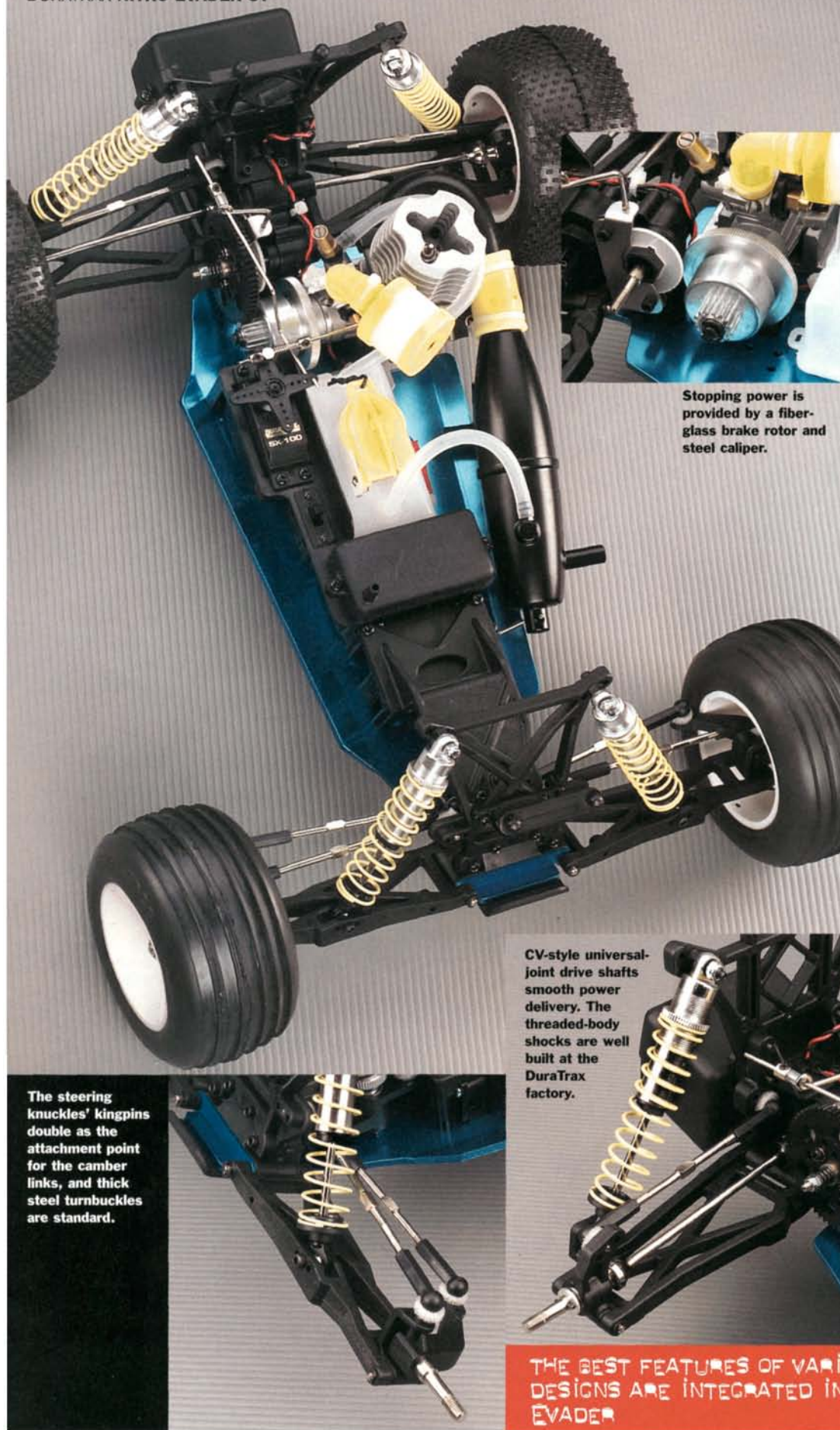
DuraTrax Nitro Evader ST





FAST, AFFORDABLE, O.S.-POWERED AND RTR!

DURATRAX WAS ONE OF THE FIRST companies to offer pro-level features to first-time racers with its electric Evader ST RTR truck. DuraTrax dared to do what very few had done before by not only including a slew of hop-ups but also by backing its products with parts-breakage guarantees. DuraTrax has added to the Evader family with a race-ready $\frac{1}{10}$ -scale nitro stadium truck—the Nitro Evader ST. The formula remains simple: include everything a first-timer needs (except fuel) in one box, from alkaline batteries for the transmitter to a video on how to start the included O.S.-built DuraTrax engine. The Nitro Evader is practically ready to go from the moment you open the box, and that means it didn't take long before I had it skying over jumps at my local track.



Stopping power is provided by a fiber-glass brake rotor and steel caliper.

CV-style universal-joint drive shafts smooth power delivery. The threaded-body shocks are well built at the Duratrax factory.

The steering knuckles' kingpins double as the attachment point for the camber links, and thick steel turnbuckles are standard.

DATA CENTER

VEHICLE TYPE 2WD off-road stadium truck
BEST BUYER Racers and enthusiasts of all skill levels

KIT RATINGS

Instructions Very good
Parts fit and finish Good
Durability Good
Overall performance Good

SPECIFICATIONS

MANUFACTURER Duratrax
MODEL Nitro Evader ST
SCALE 1/10
PRICE \$260
Varies with dealer

DIMENSIONS

Wheelbase 11 3/8 in. (287mm)
Width 12.9 in. (325mm)

WEIGHT

Total, as tested 4.3 lb. (1,950g)

CHASSIS

Type 3mm channeled plate with upper deck
Material T6 7075 aluminum/plastic

DRIVE TRAIN

Type 3-gear sealed transmission
Primary Clutch bell/spur gear
Drive shafts CV universal axle
Differential Ball
Slipper clutch Disc-type
Bearing type Shielded bearings

SUSPENSION

Type Lower A-arm with adjustable upper link
Damping Oil-filled, coil-over, threaded-aluminum shocks

WHEELS

Type One-piece dish

TIRES

Type (F/R) Pro-Line Edge/Bow Tie T (M2 compound)

ENGINE

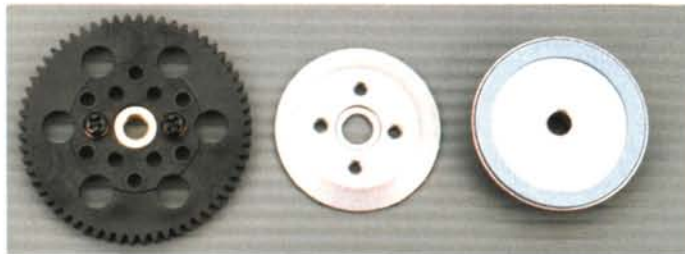
Type: DTX 18 side exhaust
Carburetor Dual-needle rotary
Manifold and pipe Aluminum manifold and dual-chamber tuned pipe
Starter Recoil pull-start
Fuel tank 75cc

THE BEST FEATURES OF VARIOUS POPULAR DESIGNS ARE INTEGRATED INTO THE NITRO EVADER

KIT FEATURES

CHASSIS. At first glance, the chassis looks familiar, but on closer inspection, you start to see that the best features of various popular designs are integrated into the Nitro Evader platform. The most prominent feature is the 3mm-thick blue-anodized-aluminum chassis made from T6 7075 stock. Both sides are rolled up to increase chassis stiffness. A 30-degree kick-up is built into the lower chassis. The molded upper-deck pieces house the radio gear and provide more flex resistance. The engine mount acts as a middle brace, and a splash shield conveniently molded into the upper deck prevents fuel from spilling onto the throttle servo and receiver switch. The rear-mounted battery box was also designed to act as a bumper and skidplate.

DRIVE TRAIN. Using a race-proven three-gear design, the Nitro Evader's tranny assembly is equipped with a hard-anodized, large-surface-area slipper clutch to help prevent wheelspin off the line and out of corners. A fiberglass brake disc is mounted on the top shaft next to the spur gear, and it's actuated with steel brake calipers. A heavy-duty adjustable ball differential comes stock and features a caged thrust-ball assembly for easy maintenance. The steel-diff outdrives spin a set of CV-style drive shafts. Metal-shielded ball bearings are installed throughout for durability and efficiency.



The slipper clutch uses a single pad and allows spur gear changes without altering the slipper setting.

SUSPENSION AND STEERING. Much of the suspension is shared with the electric Evader. Up front, molded lower A-arms are connected to the front bulkhead. Molded uprights and steering blocks pivot on the outer ends of the suspension arms. The upper camber links snap onto a ball stud/king-pin that secures the steering block to the uprights and to the shock tower in one of three holes, which also happens to be the number of shock-mounting locations on the suspension arms. Steel hinge pins are installed in all pivoting locations, and a blue aluminum hinge-pin brace helps strengthen the front bulkhead.

A separate, molded pivot block is the inboard mounting location for the rear suspension arms. A camber link connects the rear bulkhead with the rear uprights; there are multiple mounting locations on each end. As in

front, the rear A-arm has three shock-mounting holes, but the rear shock tower has five holes to choose from. The bottom-fill shocks are made from natural-finish aluminum and have dual seals as well as threaded bodies to make adjustments easier.

The steering setup is a fairly standard dual-bellcrank design with an integrated adjustable servo-saver. The steering tie rods as well as all four camber links are strong, steel turnbuckles that can easily be adjusted with the included wrench. Almost every plastic suspension component on the Nitro Evader is covered by DuraTrax's Stress-Tech 12-month guarantee; you break it, DuraTrax replaces it. That includes A-arms, stock towers, bulkheads, bumpers and even ball cups and shock bushings!



O.S. Engines manufactures the DTX .18 for DuraTrax. Note the throttle return spring—every nitro truck should have one!

ENGINE AND ACCESSORIES

O.S. Engines manufactures the DTX .18 pull-start engine that comes installed in the Nitro Evader. With a huge 3cc displacement in a small-block form, this engine has the best of both worlds: lots of low-end grunt and excellent top-end speed. A two-needle rotary carb allows fine-tuning, while a robust pull-starter

cranks the engine over. Once broken in, it started and ran very reliably—just like every other O.S. engine I've ever tested. A two-shoe clutch with a trailing engagement setup is already installed on the DTX pull-start .18 engine. A bump-start-compatible large flywheel and a 15-tooth clutch bell are also standard. The clutch bell rides on flanged ball bearings, and it's secured to the pilot shaft with a 4mm E-clip.

The 75cc fuel tank is secured to the lower chassis plate with O-rings between the tank and the chassis to provide some shock absorption. The carb's banjo fitting is pointed to the rear left tire from the factory, so the fuel line wraps around the engine head from the tank to the carb. Both the aluminum exhaust header and the tuned pipe are black-anodized and have a silicone coupler zip-tied into place. The oversize aluminum engine mount also acts as a chassis brace. Six screws secure the engine mount to the chassis, so if you have problems keeping your gear mesh tight with six screws, some RC counseling might be in order.

BODY, WHEELS AND TIRES. The Nitro Evader comes with a preprinted stadium-truck body, with all the right curves and bulges to provide a tight fit

ELECTRONICS & ACCESSORIES

DURATRAX 27MHZ RADIO SYSTEM. The built-by-Futaba-for-DuraTrax radio system is extremely reliable, durable and provides excellent reception. The radio is a basic AM system with the usual throttle and steering trims, low-battery warning light and a handy steering dual-rate function. The receiver is pretty big by today's standards but fits just right in the truck's sealed receiver box.

SX100 SERVOS. The included standard servos have no problems operating the throttle, brake and steering functions. I actually had to dial out a little steering to be able to keep the truck manageable on the loose-dirt track.

GLOW IGNITER AND BATTERIES. A DuraTrax alkaline glow igniter is also included, as are the 12 AA batteries for the transmitter and onboard battery holder. The truck even includes a C-cell to power the igniter and a fuel bottle. The only other item required to get the Nitro Evader running is fuel.



on the chassis. The graphics follow an attractive checks-and-streaks pattern, and the base and contrast colors correspond to the radio frequency that comes installed. An exhaust cutout as well as the driver's side window and the area above the engine's cooling head are already cut out, but strangely enough, there is no windshield cutout. A precut decal sheet with

numbers and other trims is also included. It's nice to see an RTR with high-performance tires such as this kit has. Pro-Line Edge, ribbed front tires in a long-wearing M2 compound are factory bonded to the front white dish wheels, while a set of Bow Tie T tires, also M2 compound, are glued to the rear hoops.

PERFORMANCE

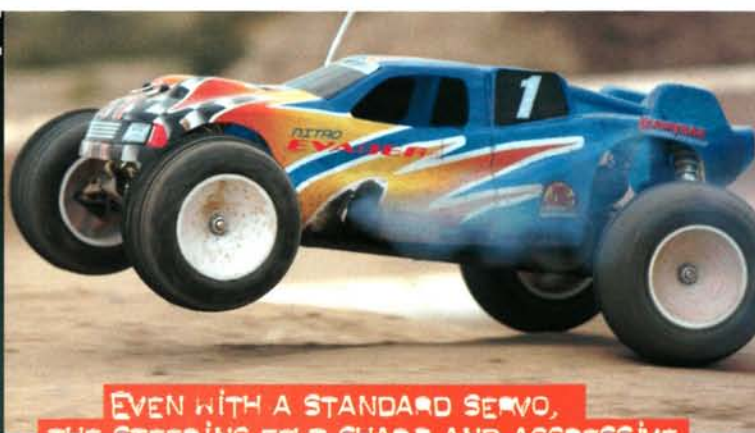
I broke in the engine in a large, wide-open parking lot. I followed the break-in instructions to the letter and fed five tanks of fuel through the engine, with the carburetor adjusted rich. I also installed a spare set of tires, so I wouldn't have to worry about ruining the new Pro-Line tires on the asphalt. While tuning the engine during the sixth and seventh tanks, it became clear to me that the slipper clutch will become a necessity on the dirt track; the DTX 18 has more power than should be legal (wait a minute; it isn't ROAR legal). Once I got to the track, it took only a couple of minutes to set the slipper to a point that allowed the truck to accelerate without wheelspin at the slightest trigger movement. I also had to richen the low-end needle a bit to tame the bottom end a tad.

The fiberglass disc brake stopped the truck well. Brake fade was minimal, and there weren't any signs of excessive wear on either the steel calipers or the rotor after our test sessions. The screw collar on the brake linkage lets you adjust brake tension, while a piece of fuel tubing helps the brakes feel more progressive with further trigger travel. It took some playing to get a good brake balance. I ended up setting some drag brake to help give the brakes more throw, which was helpful during big jumps. Giving the brakes a firm tap midair is useful for getting the truck's nose down for a perfect back-side landing. Just watch out for those less-than-perfect landings; like other trucks with battery boxes hung from the rear bumper, the Evader's battery box is prone to damage if you land the truck directly on its rear end. I managed to break my truck's battery box with just such an impact. No biggie, since it's covered by the Stress-Tech parts warranty. I also broke one of the Evader's front suspension arms with a full-throttle crash. Regardless of which brand of truck you have, this sort of thing is unavoidable if you hit stuff at nearly 40mph. But the Stress-Tech warranty has you covered.

Even though our test conditions were pretty loose, the slipper clutch prevented the truck from getting sideways all over the place. I credit the tires along with the slightly flexible suspension arms in helping to tame the powerful engine. I was pleasantly surprised by how responsive the truck was. Even with a standard servo, the steering felt sharp and aggressive at most speeds because of the short-throw bellcrank design. A slight low-speed push made me temper my tendency to dive into a corner too hot. After a few runs, the truck felt very comfortable and easy to predict, with just enough of a rough edge to keep things exciting.

THE VERDICT

The Nitro Evader is a feature-packed and exciting nitro truck. It has a powerful and reliable engine, all the race goodies, and it's bargain priced. It even has Pro-Line tires, and that makes it an exceptional value for anyone hoping to get started in nitro-truck racing. Unfortunately, that's also the "problem" with the Evader: its .18 engine isn't race-legal. Must club-track operators look the other way as long as an "illegal" engine isn't so powerful that it gives the driver an unfair advantage, but the O.S.-built DTX .18 is that powerful! If you want to race, sort it out with the race director. Despite the Nitro Evader's race-ready specs, most owners will likely use its prodigious power to decimate the competition in backyard grudge matches and parking-lot speed-runs, where a bigger engine is always a better engine. No rules!



EVEN WITH A STANDARD SERVO, THE STEERING FELT SHARP AND AGGRESSIVE

LIKES

- Powerful O.S. engine.
- High level of standard equipment.
- Everything is included, except fuel.
- 12-month Stress-Tech guarantee on suspension parts.

DISLIKES

- The engine is so far from legal that even club events may disallow it.
- Battery box is very vulnerable.

O'Donnell

20% race fuel

O'Donnell race fuel is used by many of the top nitro racers including Mark Pavidis, Billy Easton, Barry Baker, Chad Bradley, Jared Tebo, and the list goes on. I figured if it's good enough for the factory guys, it would be just right for the O.S.-built, DTX .18 engine. I was right! The engine fired right up after a few tugs on the pull-start rope and was extremely reliable during testing.



TEST GEAR

SOURCE GUIDE

DURATRAX; distributed by Great Planes Model Distributors (217) 398-8970; duratrax.com.

THE COMPETITION

MODEL	TRANSMITTER	ENGINE	DRIVE AXLES	SHOCKS	GLUED TIRES	BODY	BEARING TYPE	PRICE*	REVIEWED
DuraTrax Nitro Evader	DuraTrax by Futaba	DTX.18	CV-style universal joint	Aluminum	Yes	Painted	Ball	\$260	7/03
Traxxas Nitro Rustler	Traxxas TQ	TRX 2.5	Telescoping plastic universal joint	Plastic	No	Painted	Ball	\$299	6/03
Associated RC10GT RTR	Ace Jaguar	TTR .12	Dogbones	Aluminum	Yes	Painted	Ball	\$279	10/02
HPI Nitro Rush	HPI by Airtronics	NS .15FE	Dogbones	Plastic	No	Painted	Ball	\$259	10/00
Team Losi Triple-XNT Sport	JR XR2i	Mach .15	Telescoping plastic universal joint	Aluminum	Yes	Painted	Ball	\$329	5/02
Kyosho Ultima ST	Kyosho Perflex	GX-15	Dogbones	Plastic	Yes	Painted	Bushing	\$219	8/00
CEN Fun Factor ST	CEN Mirage III	NT-16	Dogbones	Plastic	No	Painted	Ball	\$340	3/01

Partial listing; category is too large to include all vehicles. *Varies with dealer.

RADIO CONTROL **car action** **READERS' CHOICE** **AWARDS**

by the Radio Control
Car Action team

2003

AH, YES; it's time once again for our annual Readers' Choice Awards! We've sorted through thousands of paper and online ballots to determine which cars, trucks and accessories are near and dear to our readers' hearts. You'll see a few repeat favorites, but this year, there were also a few upsets that no one saw coming. So without further delay, here are the winners for 2003!

TEAM ASSOCIATED B3

Team Associated has always been a solid contender in this category, and this year, our readers chose its venerable B3 buggy. With its molded-composite, easy-to-tune chassis, race-proven Stealth tranny and "quadra-symmetric" front and rear suspensions, the B3 has been in solid standing with our readers for years. Add that it comes in four versions—from basic RTR to full factory ride—and you can easily see that Associated has covered all the bases with this car. Interestingly, Associated's newest car, the B4, garnered a good share of the votes as well. Could this year, in fact, be the B3's "swan song" with readers? We'll find out next year

- 2 Team Losi Triple-X
- 3 Team Associated B4



ELECTRIC BUGGY



KYOSHO MP-7.5

You have unanimously chosen the multi-championship-winning Kyosho MP-7.5 as your favorite nitro buggy. Maybe it has something to do with the car's low-CG drive train, its race-proven suspension, or its rugged construction. Or maybe it has something to do with the fact that it has won the IFMAR Off-Road World Championship an amazing five times! Regardless of the reason, you felt it was worthy of the Readers' Choice award for the third year in a row.

- 2 OFNA Hyper 7
- 3 OFNA 9.5 MBX

NITRO BUGGY

TEAM LOSI TRIPLE-XT

Racing trucks return! Early on, we figured that a monster truck would take top honors in this category, but the racers turned out in droves and voted the Team Losi Triple-XT as their favorite truck. And Losi's racer is well deserving of the title. Out of the box, the truck is ready to hit the track, thanks in part to its molded-composite, Stiffezell chassis, hard-coated racing shocks with titanium-nitride shock shafts, racing-spec tires and wheels and much, much more. The Triple-XT is also available in various versions, including a ready-to-run vehicle and the current top-of-the-line Matt Francis Edition that comes complete with all the sought-after hop-ups that most racers dream of.

2 Team Associated T3
3 ТРАХКАС Е-МАХХ

ELECTRIC TRUCK



NITRO ON-ROAD TOURING CAR



TEAM ASSOCIATED NITRO TC3

It looks as if you appreciate Team Associated's efforts with the TC3 platform, not only in the electric category but in the nitro class, as well! Like its electric-powered counterpart, the Nitro TC3 features an ultra-efficient, shaft-driven drive train with disc brakes, an easy-to-tune chassis, Pro-Line tires and wheels and much more.

2 ТРАХКАС
NI6RO 4-TEC
3 HPI NI6RO RS4

TEAM ASSOCIATED TC3

With an amazing four wins under its belt, Team Associated's TC3 is an overwhelming fan favorite. With its well-proven (and often copied) shaft-driven drive train, easy-to-tune chassis and race-winning reliability, it's easy to see why the TC3 is your number-one pick.

2 Team Losi Triple-XS
3 HPI MICRO RS4

ELECTRIC ON-ROAD TOURING CAR



RADIO CONTROL car action READERS' CHOICE AWARDS 2003

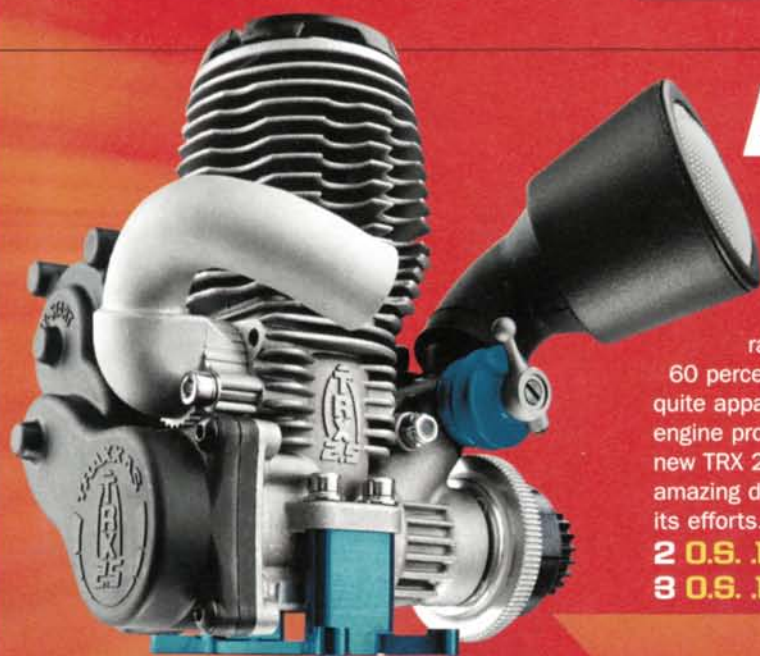
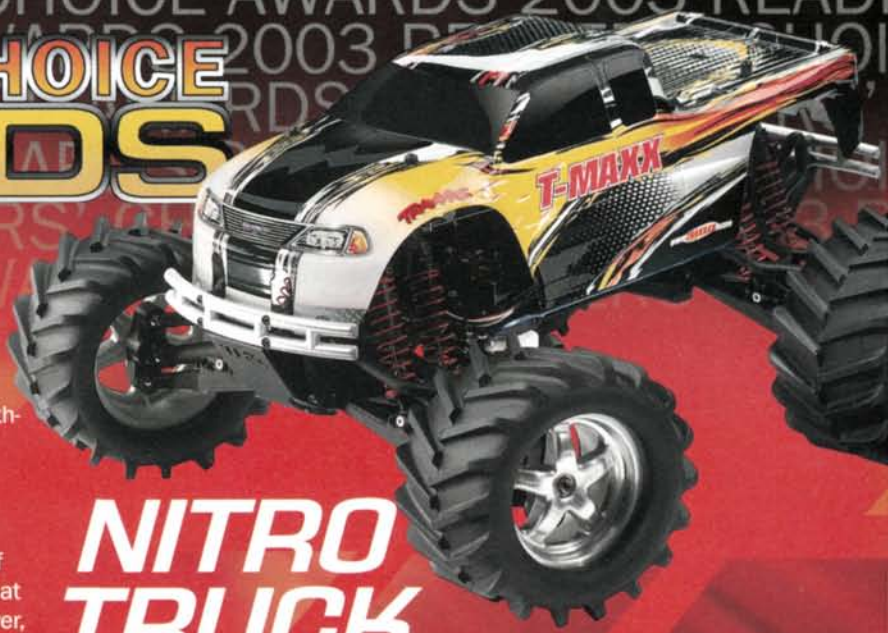
TRAXXAS T-MAXX

Honestly, were you expecting anything else? Without a doubt, the T-Maxx has been one of the groundbreaking releases in RC during the past decade. With its innovative 2-speed reversing transmission, ultra-plush, 4-wheel independent suspension (with a whopping 3.5-plus inches of travel) and an all-new, potent TRX 2.5 engine that produces a sick amount of wheelie-poppin' power, the T-Maxx is at the head of the class!

2 Team Associated RC10GT

3 Team Losi Triple-XNT

NITRO TRUCK



ENGINE TRAXXAS TRX 2.5

With all the "big-block" competition facing the T-Maxx, we were slightly surprised to see the newest version of the Maxx released with a .15 engine ... that is, until we ran it for ourselves! Traxxas claims that the new 2.5 produces

60 percent more power than its previous .15 engine, and this is quite apparent when you take a stab at the throttle. The old TRX-15 engine propelled the T-Maxx to a top speed of 30mph, whereas the new TRX 2.5 pushes the monster to speeds of 40mph plus! That's an amazing difference, and you felt Traxxas deserved recognition for all its efforts.

2 0.9. 12 CV-R

3 0.9. 15 CV-R

BODY SHELL PRO-LINE CROWD PLEAZER

Available for a wide variety of monster and racing trucks, the Pro-Line Crowd Pleazer surely lives up to its name. Cutting-edge design, low-profile fit and included details such as a decal sheet, window mask, spoiler and all the necessary mounting hardware make it your favorite.

2 Protoform Dodge Stratus

3 Team Losi Alfa Romeo



TRINITY MONSTER HORSEPOWER

Topping the charts for the second consecutive year (and coincidentally, only the second year that we've presented this category) is Trinity's Monster Horsepower fuel. Developed by Trinity's world-championship drivers Matt Francis and Brian Kinwald, the fuel consists of 99-percent pure methanol and nitromethane, and it includes a 12-percent blend of synthetic and castor oils.

2 DuraTrax/O'Donnell
3 dynamite blue thunder



FUEL

LRP PULSAR COMPETITION

Catapulted to the top of the charger charts is LRP's new Pulsar Competition charger. You, good readers, appreciate the Pulsar's finer points, such as DC operation and a variable, low 0.1 through 8A charge rate. It can charge, discharge and cycle Ni-Cd and NiMH cells, is fully programmable, has a motor break-in feature and can be used to power a solder-



CHARGER

ing iron or a comm lathe. It has about a million other cool features that would take the rest of the page to list!

2 Novak Millennium Pro
3 Reedy Quasar Pro

READERS' LONG-TIME FAVORITES

Certain companies seem to win particular Readers' Choice Award categories year in and year out. Having said that, we'd like to recognize a few manufacturers for producing standout products that the public appreciates, year after year.

BRAND	CATEGORY	WINS	PRODUCTS
Airtronics	Transmitter	8	Caliper 3PS ('96-'97) M8 ('98-2003)
Novak	ESC	8	Tempest Pro ('96), Cyclone ('97-2001) Cyclone C2 (2002) GT7 (2003)
Pro-Line	Tire	7	Square Fuzzie ('97) Dirt Hawg II ('98) Bow Tie ('99) Dirt Hawg II (2000) Masher (2001) Maxx Masher (2002) Big Joe (2003)
Trinity	Motor	8	Midnight ('96-'97) Midnight 2 ('98) Paradox ('99) P2k (2000) D4 (2001) P2k2 (2002), D5 (2003)
Trinity	Battery	7	Sanyo 2000 ('97-'99) Panasonic 3000 (2000) Panasonic Stock Metal Hydride (2001-'02) GP3300 (2003)

AND THEY'RE ON THEIR WAY!

These categories have shown the beginnings of what could turn out to be long-term sweeps (minimum of three years in a row). Here's what we have so far

BRAND	CATEGORY	WINS	PRODUCT
Kyosho	Nitro Buggy	3	MP-7.5
Team Associated	Electric On-Road	4	TC3
Traxxas	Nitro Truck	3	T-Maxx
Trinity	Fuel	3	Monster Horsepower

TRANSMITTER

AIRTRONICS M8

Once again, the crowd favorite is the Airtronics M8. Airtronics has been the clear choice of our readers since the first Readers' Choice Awards back in 1996; the M8 has won this category an amazing six years in a row! Why is it so popular? Well, it has 10-model memory, is easy to use and program and is also extremely comfortable. What else can we say? It's a great radio!

2 JR X6S
3 Futaba 3PK



car action
READERS' CHOICE
AWARDS
2003

MOTOR

TRINITY D5

Ever since we introduced the Readers' Choice Awards back in 1996, the leader in the motor category has been Trinity, and the newest winner our readers have chosen is Trinity's innovative D5 Flatliner. Its unique FlatWire technology allows the armature to start and stop faster, and that gives the motor amazing bottom-end punch. In addition, you appreciated Trinity's new external circuit board with hard-wired capacitors and its turbine can-venting system.

- 2 Reedy Ti Modified**
3 Trinity P2K2



INNOVATION

TRINITY D5 FLATLINER

The D5 Flatliner strikes twice! Our readers recognized the epic (get it?) advancement in electric motors with the release of the D5. The convention-busting armature winding found on the D5 has set new standards, and we imagine that other motor companies will be looking very closely at this design in the near future.

- 2 Novak Brushless Motor**
3 HPI Micro RS4



ESC

NOVAK GT7

Once again, Novak Electronics has emerged victorious in the ESC category. Its eighth win in a row

now belongs to the new GT7. Thirty percent smaller than Novak's previous racing speed controls (the Cyclone C2 and TC2), the GT7 manages not to compromise its predecessors' electrical specs. Its features include the now standard One-Touch Setup, seven factory-set throttle programs, onboard programming, a transmitter check mode (to see whether the transmitter has enough throttle "throw"), solder wiring tabs, radio-priority circuitry and much, much more.

- 2 LRP Quantum**
3 LRP V7i



PRO-LINE BIG JOE 40 SERIES

TIRES

This category has seen a Pro-Line sweep since the inception of the Readers' Choice Awards back in 1996. This year, you have put the rubber to the road (actually, to the dirt) and have selected Pro-Line's new Big Joe tire as your donut of choice. The aggressive-tread tire is perfect for Maxx owners who want a way to put the power down, and the oversize diameter gives the Maxx a much more aggressive stance. Oh; and Pro-Line swept the rest of the category, as well!

- 2 Pro-Line Knuckles**
3 Pro-Line Maxx Masher

BATTERY

TRINITY GP3300

Trinity has pretty much run away with the motor and battery categories every year. This time, you voted Trinity's new GP3300 cells as your favorite batteries—and with good reason. Their capacity is amazing (easily reaching upward of 3500mAh plus), and they're available in Race and Team Spec versions.

- 2 Reedy X-Cell 3300**
3 Team Orion 3300



DRIVER

MATT FRANCIS

The ever-approachable Matt Francis is now a back-to-back champion in the Readers' Choice category of favorite driver. Driving for Team Trinity/Team Losi, Matt has won big at the Worlds and has numerous ROAR titles, but his biggest accomplishment is being our readers' favorite driver. Congrats again, Matt! ■

- 2 Brian Kinwald**
3 Mark Pavidis



Team Orion Element 19T

High-torque spec power by Steve Pond

Team Orion has jumped into the growing 19-turn spec modified market with its new Element motor. Based on the "TOP" can-and-endbell design that's used for Orion's stock and modified motors, the Element offers spec racers another option in this growing and competitive racing class. The motor can be used for any purpose, of course, and there are wilder machine-wound modifieds in the same price range, but the features of this particular one make it most attractive to spec modified racers.

FEATURES

- Tagged armature and special shaft for ease of identification
- Factory-installed endbell capacitors
- Available with laydown or standard brushes
- Polarized color-coded brush heat sinks
- Timing fixed at 24 degrees

INSIDE THE MOTOR

ENDBELL. This is the same endbell that introduced factory-installed surface-mount capacitors. Two capacitors are mounted to the endbell, so you don't have to solder them into place (at least for applications that require two capacitors).

The Element's aluminum endbell heat sinks have been anodized green to match the motor's label. At each end of the brush hood there's a polarized, aluminum brush heat sink; one is anodized red, and the other is black to show which is the positive side and which is the negative side. Timing is fixed at 24 degrees. The endbell is locked into place by a tab that's indexed to the motor can. Last, but not least, the Element is available with standard brushes or laydown brushes and brush hoods; our test motor had laydown brushes.

The endbell tab that indexes to the motor can to fix timing at 24 degrees has been shortened (shown above, circled); it is shorter than the tab found on the early TOP motors. Unlike in the original TOP motor, the screws that fasten the endbell to the can do not have to be completely removed when you want to take off the endbell.



The endbell's built-in capacitors save you the trouble of soldering them into place. The Element is available with standard or laydown brushes and brush hoods; it also has distinctive, unique green-anodized brush-hood heat sinks.

MOTOR CAN. The motor can's design is the same as is used for Orion's other modified motors. It features diagonal cooling slots in the sides and four triangular vents in the bottom. This particular can, in keeping with the spirit of the rules that regulate stock racing, has "spec19" stamped into the bottom to prevent racers from can swapping and the other tricks some might try to build a "ringer" motor. Orion's G12 wet-pressed magnets are affixed to the inside of the can.

PHOTOS BY PETE HALL

DYNO TESTING

As with all motor dyno tests for *RC Car Action*, I tested the Element with a Robitronic Pro-Master dyno. I set the dyno at 7.5 volts to simulate a 6-cell battery pack, and I made sure that the motor was properly broken in, the brushes and commutator were clean and true, and the bearings were properly lubricated.

The Element puts out numbers that are very competitive in this class: 185.1 watts of power output at peak. Not only does it have good power output, but it also shows very strong torque numbers: it starts at a 251.4 Nmm (Newton millimeters) and still pumps out 137.7 Nmm at peak power output. It falls off only when at peak rpm. I expect lower peak rpm from a motor that demonstrates higher than average torque, but if you gear it as you would any other 19-turn motor, you might reduce your vehicle's straightaway speeds. I suggest that you gear up slightly to take advantage of the Element's higher initial torque.



TEST SETUP SPECS

Wind: 19 turns of 19-gauge wire
Brushes: pro-stock serrated laydown
Springs: polarized: positive (red); negative (green)
Comm. diameter: 0.295 in. (7.5mm)
Timing: 24 deg. (fixed)

DYNO TEST RESULTS

Peak rpm: 28,510
Peak power (watts): 185.1
Peak torque (Nmm): 251.4
Torque @ peak power (Nmm): 137.7
Peak efficiency: 76.5%

THE VERDICT

The Element is a strong, very capable motor in the emerging 19-turn spec class. Its excellent power output leans a little more toward torque than toward screaming-high rpm. Its total power output is as strong as that of any other motor we've tested; it just delivers its power a little differently.

SOURCE GUIDE

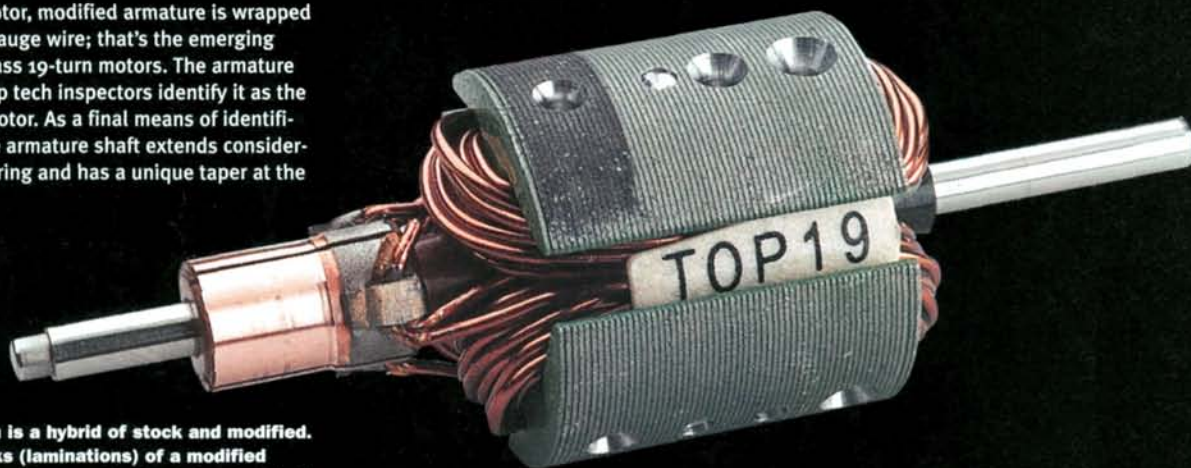
TEAM ORION INC. (714) 694-2812;
team-orion.com.
ROBITRONIC; robitronic.com.

ARMATURE. A full-rotor, modified armature is wrapped with 19 turns of 19-gauge wire; that's the emerging standard for spec-class 19-turn motors. The armature is also tagged to help tech inspectors identify it as the proper one for the motor. As a final means of identification, the top of the armature shaft extends considerably beyond the bearing and has a unique taper at the tip of its shaft.

The Element's design is a hybrid of stock and modified. It has the solid stacks (laminations) of a modified motor and the armature tags and extended motor shaft of a rebuildable stock motor.

BRUSHES. The version of the Element I tested had pro-stock serrated brushes. This type of brush balances performance and longevity; Orion prefers to install these instead of others that may run better but need to be replaced frequently. The brushes include thick copper shunts to better handle a heavy current, and the shunts have been soldered to the brush hoods for a more solid, efficient connection.

BRUSH SPRINGS. The Element's polarized springs are color-coded to identify the tension they'll provide. Springs of different tension are used on the positive and negative brushes; a slightly heavier spring is used on the positive brush.



RACER NEWS

SPONSORED BY

KYOSHO
THE FINEST RADIO CONTROL MODELS

BY GEORGE M. GONZALEZ & JASON SAMS

LOSI RACE DOUBLES AS WORLD'S WARM-UP

Team Losi held the 2nd Annual Off-Road Championship in Clearwater, FL, at Minnreg RC Club. Pro drivers from around the world took advantage of the chance to dial in early setups as practice for the World Championships that

will be held there in October. Ryan Cavallieri won 2WD Modified, and Team

Associated's Travis Amezcua won both Modified Truck and 4WD Modified.

The 2WD class has been heating up since the arrival of the new Associated B4 Stealth buggy. The B4 won the Cactus Classic, and it had a great showing at this Losi race; it took second and third. If you're keeping track of the 2WD winners, Losi and Associated each have one under their belts for 2003.



BOARD WALK

FROM THE
RADIOCONTROLZONE
.COM BULLETIN BOARD

Tuning troubles

PETER SCHULTZ: To start my stock T-Maxx, I have to raise the idle about 1/2 to one full turn. When the engine has warmed up, I have to turn the idle back down so that the truck won't jerk forward while idling.

SHOE: Try having the clutch engage later.

ROCKNBIL: You're opening the throttle to get enough fuel in there to run; right? I would say that you should leave the idle alone, but richen the low end a full 1/2 turn.

JOEMAXX: If it is cold out, you will need to run richer because fuel burns better and faster in cold temps.

How long will an engine last?

SILENTGHOST: I was told an engine would last 11 gallons.

SABOTEUR: You can get maybe 6 gallons or more.

SUBBASTUMP: I have 8 gallons through my CV.

Battery charge time?

VIPERGCH: I plan to get 3000mAh NiMH packs and a new peak charger. How long will it take the batteries to charge?

WHADL: Charge time depends on the battery's capacity and how many amps you charge at. Here is a simple formula to figure the estimated charge time: Charge time is battery capacity (B) divided by amps (A) and then multiplied by 60 (minutes). Or: B/Ax60 = minutes for the charge.

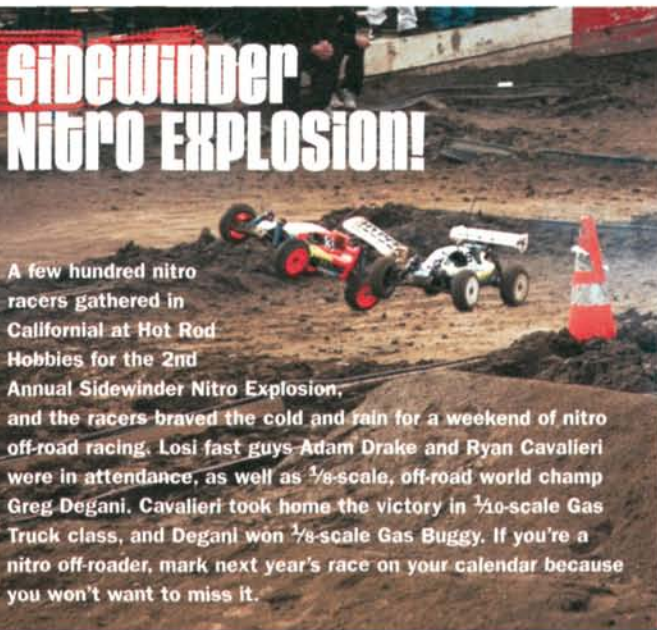
BE HEARD! LOG ON AT
RADIOCONTROLZONE.COM

Sidewinder Nitro Explosion!

A few hundred nitro racers gathered in Californial at Hot Rod Hobbies for the 2nd

Annual Sidewinder Nitro Explosion.

and the racers braved the cold and rain for a weekend of nitro off-road racing. Losi fast guys Adam Drake and Ryan Cavallieri were in attendance, as well as 1/8-scale, off-road world champ Greg Degani. Cavallieri took home the victory in 1/10-scale Gas Truck class, and Degani won 1/8-scale Gas Buggy. If you're a nitro off-roader, mark next year's race on your calendar because you won't want to miss it.



SILVER STATE RESULTS ARE IN

Every year, the most talented nitro racers travel to Las Vegas to battle for the Silver State Nitro Championship by day and then live it up at night. Team Associated driver Jared Tebo won 1/10-scale Gas Truck, and his teammates Mark Pavidis and Billy Easton grabbed second and third. Pavidis also ran exceptionally well in the 1/8-scale Buggy class; he scored the win with his Kyosho Inferno.

KYOSHO LAUNCHES MINI CUP SERIES



Hobbico has worked with several tracks throughout the country to put on a series specifically for Kyosho's popular Mini-Z racers. To get involved in the action, check out kyosho.com/events/mini-z-cup2003.html. The website explains the rules and gives you the locations and dates for all of



this year's races. Start making your plans now because the first race will be on June 7 in Clifton Park, NY.



A gentle giant will be missed

Many 1/8-scale buggy racers knew Mike "The Big Kahuna" Nivara and will be saddened to hear that he recently passed away. He was a big-hearted guy who announced at many races in Las Vegas and at the world-famous Freedom Hill racetrack near his hometown of Detroit. Everyone loved him. We'll miss you, Kahuna.

SITE SEEING



www.rc10b4.com

If you own a Team Associated B4 Stealth buggy (or plan to get one), you should definitely check out this website. You'll find loads of setup info, building tips and answers to general questions about the new buggy. Every racer will appreciate the setups that come straight from Team Associated drivers Travis Amezcua and Ryan Mayfield.

"With two cars created equal, talent should prevail."

Team Orion's Brian Dunbar, weighing in on the Associated/Losi rivalry (and sounding a lot like Yoda).

SPEED SHOP



TAKE-OFF

Ride-height gauge

When you want to set the proper ride-height on your touring car, a ride-height gauge is simply a must-have item. This new ride-height gauge from Take Off features easily readable marks in increments of 0.5mm. The machined-aluminum gauge is also available in blue-, purple- and black-anodized finishes.

Take Off ride-height gauge—item no. T0333B

Take Off; distributed by Schumacher USA (813) 889-9691; racing-cars.com.



TRINITY

Digital Heat HPI Micro & Kyosho Mini-Z tire warmers

If you've got Trinity's Digital Heat tire warmer system, you can now use it to warm up the tires of your Kyosho Mini-Z and HPI Micro RS4. Trinity's micro-size warmers plug into the Digital Heat control unit, replacing the standard touring-tire-size cups. The warmers are sold separately in two versions to suit the HPI and Kyosho tires.

Trinity Digital Heat Micro tire warmers—RC6087 (HPI Micro RS4)/RC6088 (Kyosho Mini-Z); \$50.

Trinity Products Inc. (732) 635-160; teamtrinity.com.



TEAM ORION

NIMH AA & AAA batteries

If you're tired of having to buy new alkaline AAs for your radio or AAAs for your Kyosho Mini-Zs, you need to get hooked up with some good rechargeable batteries. Team Orion's new NiMH AA rechargeable batteries have a capacity of 1800mAh to deliver longer use between recharging, and they're a great universal product for powering up transmitters, receivers and microcars. The NiMH AAA batteries have a capacity of 700mAh, so you can run your Mini-Zs for quite a long time.

Team Orion 1800mAh AA batteries—13500; \$15/4 pack.

Team Orion 700mAh AAA batteries—13200; \$11/4 pack.

Team Orion Inc. (714) 694-2812; team-orion.com.



TEAM LOSI

Machined-aluminum Triple-X4 parts

Team Losi now offers precision-machined front and rear aluminum pivot blocks for its new Triple-X4 off-road buggy. Designed for the serious racer, these new pivot blocks are machined from high-quality aircraft aluminum for unmatched strength and flex resistance and are anodized in Losi's trademark bronze-ish color.

Front inner pivots—LOSA9670

Front main mount 5/7.5/10 degrees—LOSA9671/LOSA9672/LOSA9673

Rear inner pivot mounts—LOSA9676

Rear main pivot mount 1/3 degrees—LOSA9677/LOSA9678

Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com.

SPEED SHOP



RC SCREWZ

Pro Screw Kit for OFNA 9.5

All 1/8-scale buggies rattle and vibrate like nobody's business! With that in mind, wouldn't it be a good idea to have extra screws just in case you lose a few? RC Screwz has complete screw kits for not only the most popular 1/8-scale buggies and on-road cars, but also for just about every other 1/10-scale electric and nitro off- and on-road car as well. They even have "vintage" kits for old-school Tamiya and Kyosho cars—how cool is that? Each kit comes with high-quality stainless-steel screws, set screws, nuts and washers, a plastic storage case for your hardware and the necessary standard or metric Allen wrenches. Check with RC Screwz for kit availability; they add new kits almost every day!

RC Screwz OFNA 9.5 Pro Screw Kit—OFN002; \$24.

RC Screwz (734) 260-6151; rcscrewz.com.



TAKE-OFF

Damper Can Holder

If you've ever worked on a set of shocks, you know what an invaluable tool an empty soda can can be. They're particularly helpful for used-oil storage when you're trackside, but what if you were able to make better use of the can itself? Well, check out this new Damper Can Holder from Take Off. If you slap this handy little plastic widget on top of your old soda can, it will hold your shocks after you've poured the used oil inside! It's available in blue, purple, black, yellow, pink and orange.

Take Off Damper Can Holder—T0343

Take Off; distributed by Schumacher USA (813) 889-9691; racing-cars.com.



PRO EXOTICS

Mini temp gun

If you run nitro cars, you know how important it is to keep an eye on your engine temperature; if you run it too lean, you'll end up cooking it! One of the most fail-safe ways to check engine temperature is to use a digital temperature gun. "But temp guns are expensive," is the typical reply when the subject comes up. Well, you're in luck; Pro Exotics makes this kickin' little digital temp gauge (it comes in a nice aluminum case, we might add), and it sells for a measly \$35 bucks! So now you have no more excuses and won't have to spit on your cylinder head to monitor your engine temp! The Pro Exotics temp gun is also good for making sure that your turtle isn't running too lean (check out the website).

Pro Exotics Temp Gun; \$35.

Pro Exotics (303) 347-0500; tempgun.com.

UNDER THE HOOD

Ryan Maifield's
Team Associated B4

RACE GEAR

Transmitter: JR Racing R1
Receiver: Novak XXtra
Steering servo: KO PDS-2123FET
Engine: Reedy Krypton 12x2
Battery pack: Reedy 3300 GP

Tires (F/R): Losi 4WD taper pin
(silver)/Losi BK Bar (red)
Body: Pro-Line Interceptor
Gearing: 21:81
ESC: Novak GT7

SETUP

	FRONT	REAR
Camber	1 deg. negative	1 deg. negative
Toe-in	0	3 deg. in
Ride height	Arms just below level	Drive shafts slightly below level
Caster/anti-squat	25 deg.	2 deg.
Bump-steer spacer	0.030	—
Front axle height	Middle position	—
Steering block	Trailing	—
Shock oil	30WT	27.5WT
Shock piston	No. 2	No. 2
Shock limiters	0.090	0.090
Shock spring	Silver	Gray
Shock-tower mount	Middle hole no. 2	Middle hole no. 2
Arm mount	Inner hole	Inner hole
Camber-link mount	Inner hole no. 1	Inner hole no. 1 with 2 washers
Outer camber-link mount	Outer hole position "B"	Middle hole position "B"
Wheelbase adjustment	—	Short wheelbase position
Wing-mount angle	—	6 deg.

BATTERY PLACEMENT: MIDDLE POSITION

FACTORY AND AFTERMARKET OPTIONS

- Factory Team Unobtainium shock shafts
- Factory Team front aluminum hinge-pin brace
- Factory Team graphite battery strap



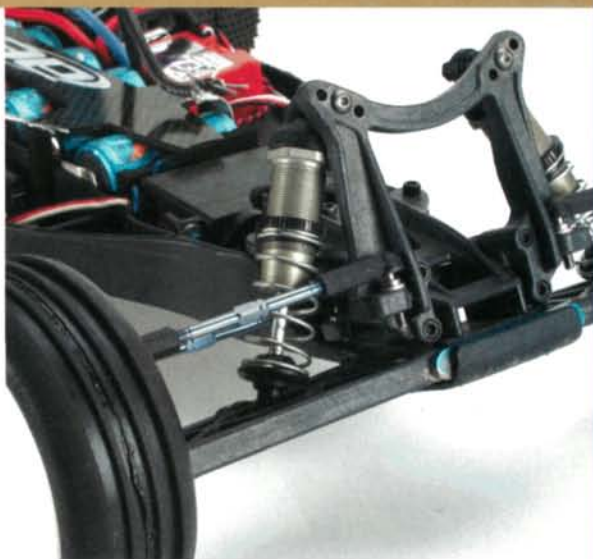
As you can see from all the scrapes on the bottom of the chassis, this buggy is raced quite often. That looks like some orange Arizona clay stuck between the scrapes! The sides of the chassis are relatively unscathed, which proves that slightly angling up the left and right sides really works.



FACTORY DRIVER HOT MOD

Take a good look at the Novak XXtra receiver; you'll notice that Ryan has hard-wired a pair of capacitors to the battery plug on the receiver. When you use high-current electric motors, the battery-eliminating circuitry (BEC) inside the ESC sometimes cannot provide enough juice to power the receiver and the steering servo during hard acceleration because most of the main battery pack's power goes to the motor. The capacitors store just enough energy to power the receiver and steering servo under these conditions.

Those front springs are so short that they look like touring-car springs. Ryan installed a complete set of Factory Team titanium turnbuckles and Unobtanium shock shafts for extra strength.



All of Ryan's electronics are perfectly centered on the chassis to improve handling. The battery pack is in the middle position, and the ESC and receiver are mounted across from each other on both sides of the chassis. Ryan actually used a Novak Cyclone 2 at the Cactus Classic, but he has since upgraded to a GT7.



SOURCE GUIDE

HORIZON HOBBY
(800) 338-4639; horizonhobby.com.
JR RACING
Distributed by Horizon Hobby Distributors.
KO PROPO
(310) 532-9355; kopropo.com.uk.
NOVAK
(949) 833-8873; teamnovak.com.
PRO-LINE
(909) 849-9781; pro-lineracing.com.
TEAM ASSOCIATED/REEDY MODIFIEDS
(714) 859-9342; teamassociated.com.
TEAM LOSI
Distributed by Horizon Hobby Distributors;
teamlosi.com.

5 QUESTIONS



DRIVER: Ryan Maifield

AGE: 16

LAST BIG WIN: '03 Cactus Classic

SPONSORS: Associated, Reedy, Novak and Pro-Line

WHEN I'M NOT RACING, I: race dirt bikes and quads and work on my 1964 Dodge pickup.

RADIO CONTROL CAR ACTION: Were you surprised to learn that you were the top qualifier in the Expert 2WD Mod class at the Cactus Classic, and that you outgunned Brian Kinwald, Matt Francis and your own teammates, Mark Pavidis and Billy Easton?

RYAN MAIFIELD: Absolutely, yes! That's something I don't see very often—especially considering that I qualified in the C-main at the previous event. I actually won the C-main last year, but I never thought I'd be the TQ at the same race the very next year.

RCCA: You had some trouble in the first Main and ended up in ninth place—ultimately, your throw-out round. Did that discourage you at all? At what point during the last Main did you realize that you had a good chance of winning?

RM: I was a little bit discouraged because I had chosen the wrong rear tire. My car was so loose that it was almost impossible to drive. Having a turn marshal step on the car and break the antenna didn't help much, either. I was a bit bummed, but my friends and teammates kept encouraging me until I calmed down. After I won the second Main, I knew I had a shot at winning the event, but it wasn't until I heard the announcer say that there were 15 seconds left in the race that I knew for sure.

RCCA: In your opinion, what are the biggest differences between the B3 and the B4?

RM: The B4 is so much more stable than the B3. You can pitch the B4 around in the corners without worrying about rolling it. The B4 stays more level when it goes through the bumpy sections of the track, and it's far more durable. The B4 is also much easier to work on than the B3. I built my B4 in less than 2 hours, and I could have the car stripped down to the bare chassis in minutes; that helps when you need to fix something fast.

RCCA: With school and homework, how do you find time to practice your RC skills?

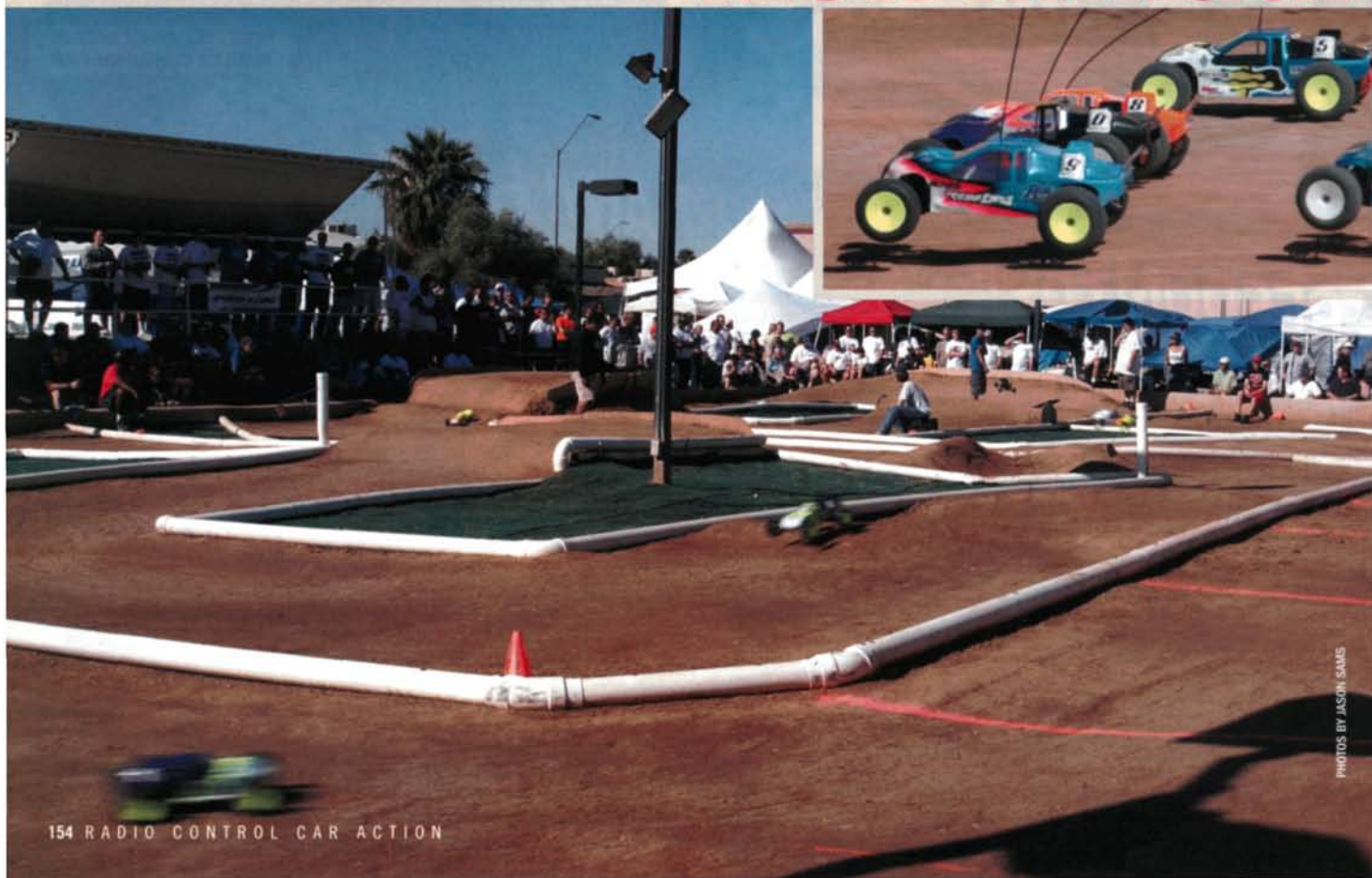
RM: It isn't too hard to find time to practice. I work part time at Scottsdale RC Speedway a few days a week, so it's easy to get some wheel time. My schoolwork always comes first, though. Sometimes, I do my homework at the track.

RCCA: What are you looking forward to studying in college? What do you see yourself doing after you graduate?

RM: That's a tough question. I'm still worried about getting through high school! I'll probably attend a community college after high school because universities are so expensive. I think that I'd like to study engineering. I could see myself designing parts for cars and motorcycles and making a living doing something I enjoy. ■



17th Annual



PHOTOS BY JASON SAMIS



The Cactus Classic had tons of free swag. All of the racers were entered in a drawing for a chance to win some pretty cool prizes that included radios, kits and matched batteries. Everyone gathered around the tables drooling as names were announced giving permission to snake a prize.



Pro-Line Cactus Classic

by Jason Sams

SPONSORED BY PRO-LINE AND RC CAR ACTION **THE B4 BLASTS OFF**

IN EARLY MARCH, THERE'S NO PLACE ELECTRIC RACERS WOULD RATHER BE THAN AT THE CACTUS CLASSIC IN SCOTTSDALE, AZ. Hot weather, hotter girls (thanks to spring break at nearby colleges) and the year's first big electric off-road race make the Cactus the big season kickoff for racers who like a little dirt with their batteries. This year's Classic was indeed a classic; the sun was out, the track was fast and consistent, and the top pro's were there. The biggest news was the racing debut of Associated's much anticipated B4 Stealth buggy, and Mighty Ryan Maifield gave the B4 a blast-off that made Associated proud.

RACING ACTION EXPERT MODIFIED 2WD BUGGY

Local racer Ryan Maifield sat atop the deep field of talented 2WD Modified drivers. When two of his four qualifying rounds were totaled, he was the only driver who had run 21 laps. Brian Kinwald (second) and Greg Hodapp (third) rounded out the top three qualifiers. In the first Main, Maifield couldn't keep up with Kinwald's pace and dropped back in the pack. Kinwald grabbed first, and teammates Matt Francis and Ryan Cavalieri took second and third. Maifield won the second and third Mains to take the overall win. Kinwald couldn't budge him despite lots of pressure, but he wrapped up second; Matt Francis was third.



MIGHTY MAIFIELD

Local racer Ryan Maifield laid down the spank with his B4 Stealth buggy. With his new ride, he won both Expert Stock Buggy and Expert Modified Buggy. Young Maifield earned a full factory ride from Team Associated because of his excellent showing at the Classic. Here's the kicker: he's just 16! Check out Ryan's factory B4 in this month's "Racer News."



DEFINITELY THE FASTEST CHICK AT THIS RACE

Ronda Skelton of Grand Terrace, CA, came to Arizona to race with the guys. Skelton has been racing on and off for more than 12 years. I asked her why she journeyed to the desert. "Everyone says this is the race to go to. The competition here is also really tough," said Skelton. She may say it was tough, but she sure made it look easy by grabbing third in Stock Truck and fourth in Stock Buggy. Oh yeah, guys; don't even think about it because she already has a boyfriend.

EXPERT MODIFIED 4WD BUGGY

Longtime rivals Mark Pavidis and Brian Kinwald were one, two on the grid with Greg Hodapp just behind them. In the first Main, Pavidis got the holeshot with Kinwald in hot pursuit. The two sent it hard in the corners at each other as they swapped spots. In the last turn of the first race, Pavidis mashed the trigger in desperation and snuck by Kinwald for the win. In the second Main, Pavidis broke, giving Kinwald the checkered flag and setting the stage for an intense dual in the third race. The two competitors were at it again and rubbing paint. Pavidis narrowly won; Kinwald was bridesmaid again; Travis Amezcua finished third.



EXPERT MODIFIED TRUCK

"Dirtinator" Brian Kinwald was the TQ of Mod Truck by over 3 seconds. Second qualifier Brent Thielke edged out third qualifier Ryan Cavalieri by $\frac{1}{10}$ second. In the mains, Thielke and Kinwald were in a dogfight for each win. The first race went to Thielke, who couldn't put it together in the second race and allowed Kinwald to take the victory. In the final Main, both drivers got out ahead to settle the standings. Kinwald's experience prevailed; he ably fended off the resilient Thielke and took home the win. Thielke finished second, and Francis rounded out the top three.



Frankie Contreras of Whittier, CA, shows the new B4 buggy he won. Settle down there, Frankie!

EXPERT STOCK BUGGY

Billy Fischer edged out local hero Ryan Maifield for the top qualifying position. Scott Spear piloted his buggy to third despite intense competition. In the Main, Maifield got out in front early, while Fischer followed closely. But Maifield kept Fischer at bay and won by several seconds. Fischer finished second in front of Brian Westerman.

EXPERT STOCK TRUCK

Doug Scripture's four very consistent rounds nabbed him the top spot. "Slick" Nick Sava, TQ after three rounds, settled into second place just in front of Marc Garvey. The Main was an edge-of-your-seat thriller as Sava and Scripture swapped spots half a dozen times. Toward the end, Scripture fell back, and that gave Sava the win. Garvey finished number two just 0.75 second in front of Aaron Waldron.





SPORTSMAN MODIFIED BUGGY

Jeff Barrett held the top position, Michael Cometti was the second qualifier, and Brian McDuffie finished third. TQ Barrett jumped to a big lead and dominated the race from start to finish. Jared Mattinley battled with Mac Mitchell throughout but pulled out second place. Mitchell finished third just a second behind Mattinley.



SPORTSMAN MODIFIED TRUCK

Brian McDuffie started on the pole with Robert Hoffman in second and Mike Friery qualifying third. McDuffie started well and held on to his lead for the win. Jared Mattinley was a man possessed as he worked his way up to finish second from the 10th qualifying position. Third place went to Mac Mitchell, who scraped paint late in the race with Mattinley.



SPORTSMAN STOCK BUGGY

Top qualifier Theo Captanis was the only driver with 19 laps when his two best qualifiers were added. The next closest competitor, Jeff Barrett, held on to second place, and Ryan James rounded out the top three. Despite Captanis' domination in qualifying, James worked his way into the lead and took control of the race. When the bell signaled the end, James took a victory lap as the only driver to run 10 laps. Luke Unis finished second with Captanis clinging to third.

SPORTSMAN STOCK TRUCK

Theo Captanis was TQ again but not by much. Combining his best two qualifiers made him just 0.07 second faster than Scott Whitlow, who was second. The fastest woman at the Cactus Classic—Ronda Skelton—qualified third and just a few 1/10 second behind Captanis and Whitlow. In the Main, a freight train led by Captanis, Ryan James and Skelton went around the track in a tight group and ended in that order.

Contributing author Nick Sava battles with Doug Scripture in the Expert Stock Truck A-main. Nick won and took home the cheddar.

The over-40 "old-timers" were pretty darn fast—not as fast as Kinwald and Mayfield, but still very respectable. Longtime racer Frank Riley sat up front in the oxygen-fed group with John Henry a few seconds back as the second qualifier; Bill "doesn't like to" Cook held down the third spot.

Riley jumped to an early lead in the Main and was followed by Henry and Cook. The three drivers swapped spots and fought for position: Riley won; Cook was second; Henry hung on to third.

ASSOCIATED'S GREAT 4WD HOPE

Mark Pavidis wheeled this Durango to 4WD Expert Mod victory, and his Associate team-mates also drove Durangos at the Cactus. The German-built cars are TC3s at heart, thanks to the shaft-drive system transplanted from the Associated tourer, but the rest of the components are custom-made for off-road use. Judging by Mark's performance with the car, the A-Team has a real shot at an IFMAR 4WD title!



WINNERS

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Tires
EXPERT 2WD MODIFIED BUGGY								
1	1	Ryan Maifield	Associated B4	Reedy	Reedy	Novak	JR Racing	Losi
2	2	Brian Kinwald	Losi Triple-X KE	Trinity	Trinity	Novak	Airtronics	Losi
3	3	Matt Francis	Losi Triple-X KE	Trinity	Trinity	LRP	Airtronics	Losi
4	7	Ryan Cavallieri	Losi Triple-X	Trinity	Trinity	Novak	Airtronics	Losi
5	6	Travis Amezcua	Associated B4	Reedy	Reedy	LRP	Airtronics	Losi
6	8	Phillip Atondo	Losi Triple-X KE	Orion	Orion	Novak	Airtronics	Losi
7	4	Brent Thielke	Associated B4	Orion	Orion	LRP	Airtronics	Pro-Line/Losi
8	9	John Ringer	Losi Triple-X	Trinity	Trinity	Novak	Airtronics	Losi
9	10	Brian Dunbar	Losi Triple-X KE	Orion	Orion	LRP	Airtronics	Losi
10	5	Billy Easton	Associated B4	Reedy	Reedy	LRP	Airtronics	Losi
EXPERT MODIFIED 4WD BUGGY								
1	1	Mark Pavidis	Durango	Reedy	Reedy	LRP	Airtronics	Losi
2	2	Brian Kinwald	Losi Triple-X4	Trinity	Trinity	Novak	Airtronics	Losi
3	5	Travis Amezcua	Durango	Reedy	Reedy	LRP	Airtronics	Losi
4	7	Ryan Cavallieri	Losi Triple-X4	Trinity	Trinity	Novak	Airtronics	Losi
5	3	Greg Hodapp	Losi Triple-X4	Peak	Peak	Novak	Airtronics	Losi
6	4	Billy Easton	Durango	Reedy	Reedy	LRP	Airtronics	Losi
7	9	Brian Dunbar	Losi Triple-X4	Orion	Orion	LRP	Airtronics	Losi
8	6	Matt Francis	Losi Triple-X4	Trinity	Trinity	LRP	Airtronics	Losi
9	10	Phillip Atondo	Losi Triple-X4	Orion	Orion	Novak	Airtronics	Losi
10	8	Scott Brown	Durango	Reedy	Reedy	LRP	Airtronics	Losi
EXPERT MODIFIED TRUCK								
1	1	Brian Kinwald	Losi Triple-XT MF	Trinity	Trinity	Novak	Airtronics	Losi
2	2	Brent Thielke	Associated T3	Orion	Orion	LRP	Airtronics	Pro-Line/Losi
3	4	Matt Francis	Losi Triple-XT MF	Trinity	Trinity	LRP	Airtronics	Losi
4	3	Ryan Cavallieri	Losi Triple-XT MF	Trinity	Trinity	Novak	Airtronics	Losi
5	5	Billy Easton	Associated T3	Reedy	Reedy	LRP	Airtronics	Losi
6	6	Travis Amezcua	Associated T3	Reedy	Reedy	LRP	Airtronics	Losi
7	10	Greg Hodapp	Losi Triple-XT MF	Peak	Peak	Novak	Airtronics	Losi
8	7	Brian Dunbar	Losi Triple-XT MF	Orion	Orion	LRP	Airtronics	Losi
9	9	Mark Pavidis	Associated T3	Reedy	Reedy	LRP	Airtronics	Losi
10	8	Jim Gard	Losi Triple-XT	*	*	*	*	*
EXPERT STOCK BUGGY								
1	2	Ryan Maifield	Associated B4	Reedy	Reedy	Novak	JR Racing	Losi
2	1	Billy Fischer	Associated B4	Ballistic	Reedy	Novak	Airtronics	Panther
3	5	Brian Westerman	Losi Triple-X	Orion	Orion	Novak	Airtronics	Losi
4	3	Scott Spear	Associated B4	Reedy	Reedy	LRP	Airtronics	Losi
5	9	Jeremy Felles	Losi Triple-X	Reedy	Banzai	Novak	Airtronics	Losi
6	4	Richard Lake	Associated B4	Pro-Match	Pro-Match	LRP	Airtronics	Losi
7	7	Jeremy Kopp	Losi Triple-X	Pro-Match	Peak	Novak	Hitec	Losi
8	10	Robert Hoffman	*	*	*	*	*	*
9	8	James Gallatin	Losi Triple-X	EMB	Peak	LRP	Airtronics	Losi
10	6	Doug Scripture	Losi Triple-X KE	Peak	Peak	LRP	Airtronics	Losi
EXPERT STOCK TRUCK								
1	2	Nick Sava	Losi Triple-XT	Pro-Match	Trinity	Tekin	Airtronics	Panther
2	3	Marc Garvey	Losi Triple-XT MF	Trinity	Trinity	Novak	Airtronics	Losi
3	6	Aaron Waldron	Losi Triple-XT MF	Trinity	Trinity	Novak	Airtronics	Panther
4	4	Alex Fleet	Losi Triple-XT	Trinity	Trinity	Novak	Airtronics	Losi
5	7	Josh Nelson	Losi Triple-XT	Ballistic	Birdman	LRP	Airtronics	Losi
6	1	Doug Scripture	Losi Triple-XT MF	Peak	Peak	LRP	Airtronics	Losi
7	5	Charlie Perez	Associated T3	Pro-Match	Reedy	Novak	*	Pro-Line
8	10	Matt Lauerman	Losi Triple-XT	Orion	Trinity	Novak	Airtronics	Losi
9	8	Robert Hoffman	Losi Triple-XT	Orion	Orion	Novak	Airtronics	Panther
10	9	Richard Trujillo	Losi Triple-XT MF	Peak	Peak	Novak	JR Racing	Losi
SPORTSMAN STOCK BUGGY								
1	3	Ryan James	Associated B4	Orion	Orion	LRP	Airtronics	Losi
2	4	Luke Unis	Losi Triple-X	Birdman	Birdman	Novak	Airtronics	Losi
3	1	Theo Captanis	Losi Triple-X KE	Orion	Orion	LRP	Airtronics	Losi
4	10	Ronda Skelton	Losi Triple-X	Orion	Orion	LRP	Airtronics	Panther
5	8	Jonny Mans	*	*	*	*	*	*
6	9	Ross Read	Losi Triple-X	Orion	Trinity	Novak	Airtronics	Losi
7	5	David Burnell	Losi Triple-X	Peak	Peak	Novak	Airtronics	Losi
8	2	Jeff Barrett	Losi Triple-X	Orion	Orion	Novak	Airtronics	Losi
9	7	Sean Cahill Sr.	*	*	*	*	*	*
10	6	Frank Contreras	Losi Triple-X	Reedy	Orion	LRP	Airtronics	Losi

*Information not supplied by driver

PRODUCT PROFILE

HITEC AggressorCRX

by George M. Gonzalez



PHOTOS BY PETE HALL

A New High for Hitec

Hitec has revamped its radio line with the introduction of three sleek new systems under the Aggressor banner. The Aggressor CRX replaces the Lynx 3D as the company's flagship computer radio. With a 20-model memory (with model naming), channel mixing, servo subtrims, a dot-matrix display and a 1024-step resolution for super-smooth servo operation, it's loaded with features that are unavailable on any of Hitec's previous car radio systems. Let's take a closer look at Hitec's hot pistol.



TESTING

I set up the CRX radio system in my HPI Savage 21. My Savage is equipped with the optional reverse module, so I knew I'd be able to exploit the CRX's 3-channel shift capability. I used the truck's stock steering and throttle servos, but I enlisted the Hitec HS-325HB servo to take care of the shift duties. Fortunately, the truck includes servo horns to fit all popular servos, including Hitec's. The DCX receiver is much more compact than the stock Futaba receiver is, so it fit the radio box perfectly and freed up some space in the process. Thanks to the CRX's straightforward programming, setting up the radio was easy.

All the adjustments are allocated to two function modes. The most frequently used adjustments, including model-select, subtrims, EPA, exponential, ABS and channel mixing, are in the programming mode. To access the programming mode, hold the function button down for 3 seconds after you flip the power switch on, and press the function button to scroll through the various menu screens within the programming mode; use the select and data plus or minus keys to make adjustments.

The main edit mode contains the adjustments that you'll need to set only once. Model naming, model copy, model reset, servo-reversing and the third-channel options are contained within the main edit mode. To access the main edit mode, press the function button while simultaneously flipping the power switch on.

The CRX design is ergonomic. The grip feels comfortable, and the steering dual rate and brake ATL are lined up on the handgrip and are easy to access. The third-channel shift button is just below and to the left of the wheel, so you can access it with your thumb.

After a few minutes of setup, my Savage 21 was ready to hit the hills. I was immediately impressed by the CRX's rock-solid reception and super-long signal range. I never had any interference problems, even when I drove the truck nearly out of sight. The first time I pressed the shift button, nothing happened. I quickly realized that the auxiliary channel 3 had been set to the linear mode, which disables the shift button. After I had set the auxiliary channel to the shift mode, the shift button worked as it should, and the truck went into reverse.

I really like the high-resolution LCD. When you first switch the unit on, Hitec's logo scrolls across the screen and the bright blue RF indicator light looks cool. Having a 20-model memory might seem a little excessive, but you'll be able to store multiple setups of the same model to accommodate many track conditions. For instance, you can store a vehicle's setup information for a high-bite track, a loose track, a big track, a small track and so on. If you race four vehicles and store five track setups for each one, you'll appreciate the CRX's 20-model memory capability.

THE VERDICT

The Hitec Aggressor CRX is comfortable to hold, it has an impressive list of features, and it's easy to program. The unit performed flawlessly during my tests, and I felt attached to it just minutes after I flipped the power switch on. Hitec has put together an affordable and feature-packed radio system that's a must-see in the competition radio market.

CRX HARDWARE FEATURES

FM OPERATION

Naturally, Hitec's top-of-the-line transmitter is a frequency modulation (FM) unit; FM radio systems provide cleaner, more reliable reception than amplitude modulation (AM) systems and are much less prone to glitching in crowded environments such as the racetrack where lots of transmitters are operating simultaneously.

HIGH-RESOLUTION LCD

The sophisticated multi-pixel liquid crystal display (LCD) allows graphics and symbols to be displayed clearly and allows users to make many adjustments on a single menu screen. The function button is used to navigate through the various function menus, while the select, data plus and data minus buttons are used to adjust the various parameters of the selected functions. Battery voltage, total "on" time, model setting, steering dual rate and brake automatic travel length (ATL) values and trim settings for all three channels are always displayed on the startup screen.

REMOVABLE MODULE

You can easily switch from 27MHz to 75MHz (or vice versa) by installing the appropriate radio frequency (RF) module. The CRX also accepts Hitec's Spectra Module, which can synthesize all 30 75MHz transmitter (TX) frequencies.

DIGITAL TRIMS

The throttle, steering and third-channel trims, dual-rate functions and brake ATL are adjusted electronically by moving the digital trim levers that surround the steering wheel. The steering, throttle and third channel trim values are always displayed on the screen, and the appropriate cursors move when one of the levers is pressed.

STEERING-WHEEL TENSION ADJUSTMENT

Tightening or loosening the tension-adjustment screw above the steering wheel will adjust the steering wheel's tension.

TRANSMITTER CHARGING JACK

A charging jack on the radio's left side allows you to plug in the included charger to juice up the Ni-Cd TX batteries.

INTERCHANGEABLE RUBBER GRIP PADS

The CRX has a removable, rubber grip pad that cushions the handgrip. Optional pads in assorted colors are available to customize the radio's look.

LOW-BATTERY ALARM

The CRX emits a continuous beeping when the TX battery power is too low to provide reliable operation.

>>>> TWENTY-MODEL MEMORY

With room to store data for 20 models, the CRX is the new king of model memory. A 6-character model-naming feature makes identifying each model easy.

>>>> THREE-CHANNEL OPERATION

The CRX's auxiliary third-channel function can be programmed to provide partial or full travel in both directions to perform transmission shift functions on a nitro-powered monster truck and to provide linear servo travel to control a remote, fuel-mixture needle valve on a gas boat or large-scale RC car (or any other function you can dream up). When it's in the linear mode, the auxiliary digital trim lever on the right side of the wheel is used to make trim adjustments. Set the auxiliary channel to the shift position, and you'll be able to use the shift button that's on the handgrip just below the wheel to operate a shifter servo.

>>>> STEERING & THROTTLE TRIMS

All radios have this feature, but the CRX gets the job done using digital trim levers around the steering wheel.

>>>> SERVO-REVERSING

This function is available on all three channels and is accessed through the program menu. The settings for all three channels appear on a single menu screen to simplify programming.

>>>> SERVO SUBTRIM ADJUSTMENT

The CRX is the first Hitec radio to have this highly useful feature, and it's available on all three channels. The subtrim function is used like the regular trim function, but the adjustment increments are much finer. This makes it much easier to center the servos, and it's particularly helpful when trimming out your car's steering.

>>>> UP/DOWN TIMER

The CRX doesn't have a lap counter, but it does have a timer that can be programmed to count up from zero (great for measuring run time) or down from a time you set. The maximum setting is 59 minutes, 59 seconds.

>>>> SERVO MIXING

This advanced feature allows two servos to be controlled by a single input from the wheel or trigger by mixing the selected channel with the third channel. It's useful in setting up large-scale vehicles with independent four-wheel braking and monster trucks with four-wheel steering.



>>>> ADJUSTABLE ENDPOINTS (EPA)



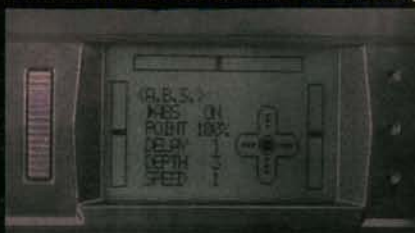
ting, the CRX's ATL function allows you to adjust the endpoint of the brake travel while driving by means of a thumb switch.

>>>> EXPONENTIAL



the servo will respond less quickly to movement of the steering wheel near neutral and more quickly as it reaches the end of its travel. A positive setting has the opposite effect: the greater the value, the greater the difference between most and least responsive.

>>>> ANTI-LOCK BRAKE SYSTEM (ABS)



brakes must be applied before the ABS kicks in), depth (the amount the servo moves as it modulates the brake) and speed (how the duration of each brake pulses during modulation).

>>>> DUAL-RATE STEERING



The EPA values for "ST" (steering), "THRO" (throttle) and "AUX" (auxiliary or third channel) are displayed on a single menu screen to simplify programming. To access the channel to be adjusted, press the select button and use the data plus or minus buttons to make adjustments. In addition to the usual brake endpoint set-

"Expo" can be applied to the steering and throttle channels. The expo is displayed on the screen as a negative or positive value, and a line graph shows the steering or throttle curve. Adjusting the exponential changes the way the servo responds to input from the transmitter. For example, if you set the steering expo to a negative value,

After entering the programming mode, press the function button to scroll over to the ABS menu. Press the data plus or minus buttons simultaneously to turn the ABS function on or off. From a single function screen, you can set the ABS point (the amount of servo travel that must be reached before the ABS activates), delay (the amount of time the

The CRX features a thumb dial to adjust the steering dual rate. Moving the dial changes the value shown on the LCD, and the dial's position makes it easy to adjust as you drive.

INCLUDED ACCESSORIES

The CRX is available in 27 and 75MHz versions (part nos. 127751 for 75MHz and 127271 for 27MHz). Both versions include the following and sell for about \$220 (actual price varies with dealer).

HITEC DCX 3-CHANNEL RECEIVER

According to Hitec, this dual-conversion FM receiver filters the RF signal twice for superior reception.

HS-325HB SERVO

Hitec's ball-bearing, high-speed servo has a 0.15-second transit time and 49 oz.-in. of torque, so it's a good match for most 1/10-scale steering chores.

8-CELL NI-CD BATTERY PACK

It's nice to get rechargeable batteries as standard equipment, and Hitec even includes an AC charger to juice up the cells while they're in the transmitter; the unit can also slow-charge a receiver pack. A 4-cell battery holder is included, in case you prefer dry cells.

A "Spectra Deluxe" version of the CRX is also available (127752). It includes all the items mentioned above as well as Hitec's Spectra Module and a Novak XXtra receiver for crystal-less operation. This setup costs about \$300. You can also buy the CRX with a Spectra Module and TX batteries only (127753).

SOURCE GUIDE
HITEC RCD (858) 748-6948; hitec.com.

BATTERY GOLDEN RULES

by Lito Reyes

RULE 1

NI-CD AND NIMH CELLS DIFFER, SO DON'T TRY TO CHARGE THEM IN THE SAME WAY.

If you use Ni-Cds, you can charge them with just about any peak charger, but NiMHs are quite a bit pickier in the way they need to be charged. As a Ni-Cd cell is charged, its voltage increases steadily until it is fully charged. Once its voltage has peaked, it starts to drop and does so dramatically. A peak-detecting charger looks for this sharp voltage drop and then stops charging. Ni-Cd chargers typically look for a 10- to 15-millivolt (mV) drop per cell before they stop charging. When a NiMH cell is charged, the voltage rises in the same way as that of a Ni-Cd cell, but once it's fully charged, its voltage drops only slightly—in most cases, only 3 to 5mV, at which point the cell's temperature rises significantly. Chargers designed to handle NiMH packs either have a specific NiMH mode, or they allow you to set the voltage threshold to a low, NiMH-friendly setting.

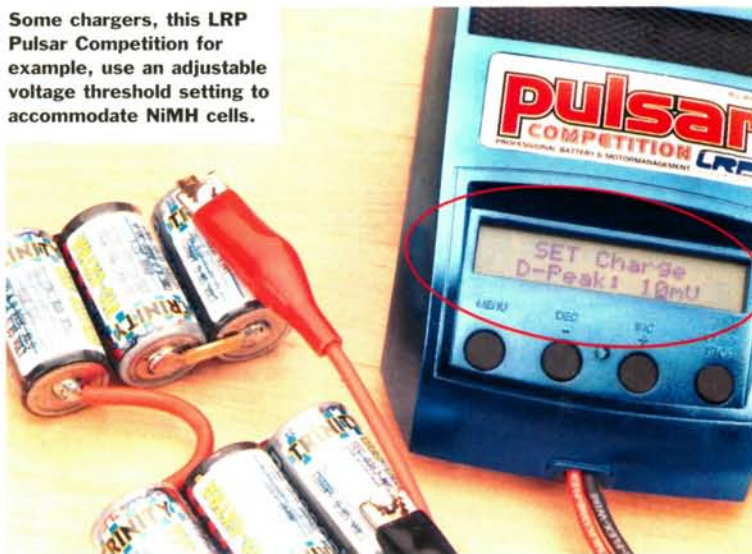
HERE'S WHAT YOU NEED TO REMEMBER

- ▶ This is an easy one. If your charger has a NiMH mode, use it!
- ▶ Do not use pulse-charge or flex-charge modes with NiMH cells.
- ▶ If your charger has adjustable voltage threshold, 10mV per cell for Ni-Cds (or 60mV for a 6-cell pack) and 4mV per cell for NiMHs (or 12mV for a 6-cell pack) are good default settings.
- ▶ If you plan to use NiMH cells and your charger isn't designed to use them, you can still charge them safely as long as you monitor the pack's temperature as it's being charged. As soon as the pack is warmer than ambient temperature, stop charging it; it's fully charged.

Got a NiMH mode like this Novak Millennium Pro? Be sure to use it!



Some chargers, this LRP Pulsar Competition for example, use an adjustable voltage threshold setting to accommodate NiMH cells.



RULE 2

DON'T LET THE BATTERY PACK GET TOO HOT.

Because we subject our packs to extreme conditions—extremely high discharge rates, often with little cooling airflow—they get hot. Minimizing heating lengthens a pack's life.

TO AVOID OVERHEATING YOUR PACKS, KEEP AN EYE ON THE FOLLOWING

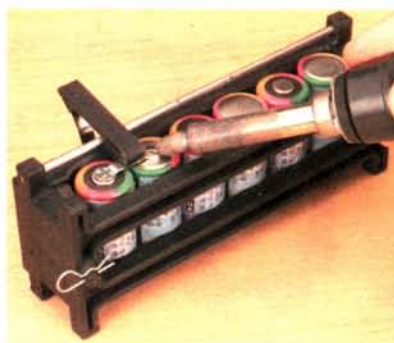
- ▶ **Charge rate.** One of the most common ways we unnecessarily overheat our packs is by charging them at a rate that's too high. Just because your charger will let you fry a pack at 7 amps, doesn't mean you should! For today's sub-C cells, charging at 5 amps is almost universally accepted.
- ▶ **Over-gearing.** If your car's run times are short, it feels slow off the line, and the motor never seems to "wind out," it's a safe bet your car is over-gearred and you're really cooking the battery. Install a pinion with fewer teeth or a spur gear with more teeth. Your car should run for at least 5 minutes on a charge, no matter which type of battery you have, and the pack should be only warm after a run—not red-hot.
- ▶ **Improper soldering.** Don't cook your pack when you wire it. Use at least a 40W iron—preferably one with a broad, flat tip that can distribute heat evenly over a large area. A wide tip is preferable because you won't have to hold it on the cell for long to heat it enough to melt solder; 5 seconds is long enough to hold a solder-iron tip on a cell. If it takes longer than that, your iron isn't hot enough or its tip isn't wide enough—perhaps both.



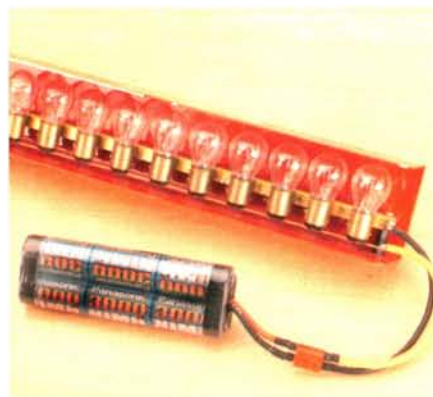
A high-quality, powerful soldering iron is an investment you will never regret. Don't bother assembling expensive batteries with a cheap iron!



When assembling cells, a fat soldering-iron tip is best. Narrower tips are better for wiring work.



Be careful not to cook the cells when you assemble them; if your soldering iron can't get the job done in 5 seconds or less, you need a more powerful iron (or a new tip).



This Reedy Quasar Pro has an adjustable discharge rate and voltage cutoff point—very nice, indeed.

Automotive taillight bulbs are the classic discharge device. Deans offers this 10-bulb, 20A discharger that you can buy assembled or in kit form.

RULE 3

FULLY DISCHARGE NI-CDS BEFORE YOU STORE OR RECHARGE THEM

Because of the way in which the chemicals inside Ni-Cds react, they are prone to a "memory effect," or "voltage depression." If a battery is repeatedly charged when it isn't fully discharged, it will be "trained" to release less power. For example, if you make a habit of running a pack for a couple of minutes, recharging it, running it a while longer and then putting your car away for a week, your month-old 2400 pack will start to perform like an old pack of 1500s (and not even those good ol' SCRs).

To avoid this, always fully discharge a Ni-Cd pack before you recharge it. A pack is considered fully discharged when every cell is at 0.9 volt (5.4 volts for a 6-cell pack).

TO DISCHARGE YOUR PACKS SAFELY, DO THIS

- ▶ Use a charger with a discharging function. Many chargers have a discharging function, and some may be programmed for packs with differing numbers of cells and have adjustable

amperage. Ideally, you should discharge your packs at an amp rate that's similar to the rate at which the pack will be used; 20 amps is usually a good all-around number for 6-cell packs.

- ▶ Discharge the pack on a bulb discharger. W.S. Deans offers a great one as a kit and assembled. You could also build one using no. 1157 automobile taillight bulbs. Each bulb draws about 2 amps of current. If you're handy with a soldering iron, solder 10 bulbs for a 20A load. (For detailed building instructions, see the February 2000 issue for "How to Build a Battery Dumper.") Disconnect the pack when the bulbs start to dim, or use a digital voltmeter to monitor the pack's voltage, and disconnect the pack when it has been drained to 5.4 volts.

- ▶ If you don't have any type of discharger, simply run the battery until your car slows to a crawl. Don't run it until it can't move anymore and then keep yanking the trigger; that puts an excessive drain on the battery pack.

► After discharging, use an equalizing tray (for side-by-side packs) or a resistor (for stick packs). This is optional. If you run side-by-side or saddle packs, using an equalizing tray takes the discharging process a step further. Even if your packs are made of matched cells, the cells will end up with different voltages when they're discharged as a pack. An equalizing tray discharges the cells individually so that they are all equally drained. If you use matched packs, you should definitely invest

in an equalizing tray.

If you use stick packs, you can plug a 30-ohm resistor into the pack to drain the voltage safely as low as it can go. Trinity offers an assembled resistor with connector just for this purpose. Whether you use a tray or resistor, be certain to use it only after you have discharged your pack in your car or on a discharger; trays and resistors are used to drain off the cells' residual voltage and should not be used to deplete fully charged packs.



A discharge tray such as this Trinity Real Time 2 will bring all your cells down to the same voltage.



If you run Ni-Cd stick packs, use a 30-ohm resistor to drain off residual voltage after you first run the pack in your car until it slows to a crawl.

RULE 4

CHARGE NIMHS BEFORE YOU STORE THEM.

Here's another way that NiMHs differ dramatically from Ni-Cds: NiMH cells don't like to be stored fully discharged, and if they are, they will lose capacity—kind of like the Ni-Cds' memory effect. Ni-Cds and NiMHs suffer from "self-discharging": a fully charged battery, if left alone, will discharge itself. So if you store a NiMH pack for a few days, even in a "safely discharged" state of 0.9V per cell, the cells could discharge themselves to a dangerously low level. The cells won't be damaged, but they will feel "flat" or slow for a few runs, and when being charged, they may false peak (show a voltage drop before they're fully charged). This effect is rarely permanent, and the cells should "wake up" after a few charge/discharge cycles.

NIMHS REQUIRE MORE MAINTENANCE THAN NI-CDS TO BE KEPT IN GOOD SHAPE.

HERE ARE THE GUIDELINES FOR NIMH CELL CARE

- Before you store a NiMH pack, discharge it fully as already described, and then charge it. If you don't plan to use it for at least a week, put about 30 percent of a charge in it before you put it away. If you plan to store it for a month or more, fully charge it first.
- When you take a NiMH pack out of storage, first fully discharge the cells, and then charge them for use. A rested NiMH cell can be described as a bit "out of shape"; it needs to "stretch and exercise" before it will provide maximum capacity and punch. If you discharge the pack's leftover stored energy before you charge it, you'll help it to perform better on its first run after it has been stored. Discharge the pack, let it rest for about an hour, and then charge it up. Also, most experts feel that NiMH packs run better when they're used more than once a day, so don't hesitate to use a pack up to three times daily; just be sure to let it cool down and rest before you re-charge it.
- Use an equalizing tray after discharging. Just like Ni-Cds, NiMH cells can benefit from being placed in an equalizing tray, especially before being charged after they've been stored. It is an extra-extra step, but it will help matched batteries keep their match. ■

RECEIVER-PACK TIPS

GOT NI-CDS? DISCHARGE FIRST

Just like their larger, sub-C cousins, Ni-Cd receiver packs like to be stored in a discharged state; NiMH packs like to be stored with a charge in them.

HERE'S HOW TO DISCHARGE A NI-CD RECEIVER PACK

1. Wire one no. 1157 automotive taillight bulb to a female receiver jack that matches your pack. The bulb will draw about 2 amps, which is the resist you'll ever need to drain a receiver pack.
2. Plug the pack into the bulb, and watch it as it glows. As soon as it starts to dim, disconnect the battery. Your pack is now discharged and ready to be put away.

CHARGING YOUR RECEIVER PACK

The AC-powered "overnight" chargers available for receiver packs offer the safest way to charge a pack, but if you don't have 12 hours between your qualifier and the Main, you're out of luck. Not to worry; you can fast-charge a receiver pack safely as long as you use a charger that can be set for a 5-cell pack. The Reedy Quasar Pro, LRP Pulsar and Novak Millennium Pro and Ionic have this feature (see the "Pro Charger Guide" in the April 2003 issue for more info). Your unit's charge amperage must also be adjustable; set it to charge at no more than 1 amp.

SOURCE GUIDE

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PRODUCT PROBE

NOVAK Super Sport Brushless Motor

by Steve Pond



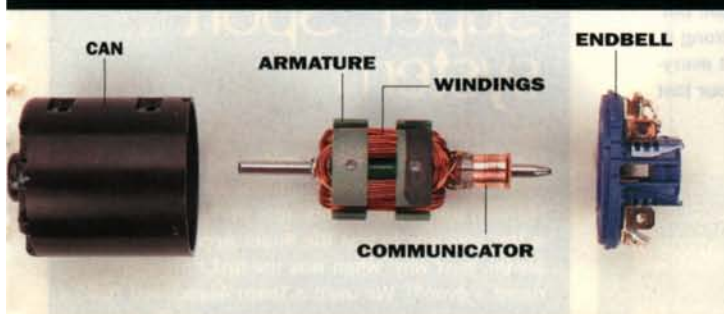
The Super Sport is the first in what is to be a series of Novak brushless motor systems designed specifically for use in RC cars and trucks. Also known as the SS5800, the Super Sport is designed to replace brushed motors in applications that would otherwise call for 6 or 7 cells and a 10-turn (or higher) modified motor.

According to Novak, the Super Sport represents the most advanced brushless sensor-based motor technology for RC. We tested the new system against an equivalent brushed motor to see whether Novak has come up with something better or just something different.



➤ Understanding brushed and brushless technology

It isn't hard to understand the essential differences between brushed and brushless motors. In conventional "brushed" motors, the brushes transfer power to the windings on the armature. The brushes energize the windings on a segment of the armature, and that creates an electromagnetic field that causes that armature segment to be attracted to the magnets in the motor's can; this, in turn, causes the armature



In a brushed motor, the wire windings and armature laminations do the spinning. Energizing the wire windings requires contact between the brushes and commutator.

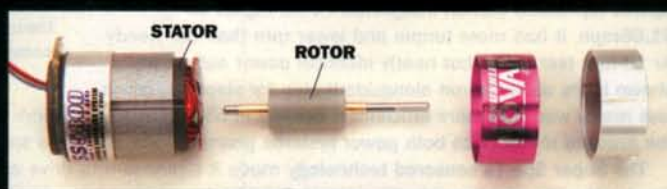
to rotate. The brush then contacts the next segment of the commutator, and the process is repeated. This happens many times a second, causing the armature to spin smoothly. It isn't quite that simple, but



With the motor disassembled, it's easier to see how the brushes work. Spring tension forces them against the commutator. As the armature spins, the commutator's segments are energized, in sequence, by the brushes. The downside is the wear caused by the parts rubbing together and the heat caused by the friction this rubbing generates.

it's important to remember that the windings and the steel laminations they are wrapped around are the spinning parts inside the motor, and physical contact between the brushes and commutator is required to energize the fields on the armature. This contact between the brushes and the spinning commutator is a problem; friction between these parts causes heat, and the brushes are constantly being worn down on the commutator. This means you have to replace them regularly and periodically clean or even re-true the commutator.

A brushless motor, on the other hand, is a like a brushed motor turned inside-



The Super Sport's only moving part is the rotor. The aluminum cap holds the motor together with three screws that reach back to the motor's rear. The parts do not form a "can" in the conventional sense.

out. The laminations that, in a conventional motor, are usually stacked to form the armature are instead stationary and installed in the motor housing (called a "stator"). The wire windings that are conventionally wrapped around the spinning armature are wound in and around the laminations in the brushless motor housing. The magnets, which are stationary in a standard motor can, are built into a brushless motor's spinning rotor. The key difference is that the brushless motor—as its name says—doesn't have brushes. Instead, its static windings are energized electronically by a specialized speed control. In simple terms, the speed control does the same job as the brushes do in a conventional brushed motor.



Here's a good shot of the stationary windings and the steel laminations they are wrapped around to form the stator. The windings are energized by the speed control to spin the rotor without any contact between the parts.

SENSORED AND SENSOR-LESS BRUSHLESS MOTORS

The Super Sport system uses a "sensored" motor; electronic sensors inside it "tell" the ESC in which position the armature is in. This allows the ESC's microprocessor to compare the instructions it's getting from the receiver with what is actually happening at the motor and to make corrections as needed.

Sensor-less motors lack this feature and, as a result, do not have fine throttle, brake, or reverse control. This isn't an issue for RC airplanes and boats, for which sensor-less motors are designed, but in RC cars and trucks, throttle control is everything, so sensored motors are the clear choice.

Results

REEDY KR 10X2 MOTOR, NOVAK GT7 SPEED CONTROL, TRINITY GP3300 MATCHED PACK

The Reedy Kr motor was very fast. It accelerated hard, and with the aggressive race gearing taken from Baker's setup, it reached a top speed of 41.24mph. Its 60-foot acceleration times averaged 1.71 seconds, and it clicked off 120 feet in just 2.77 seconds. On the test oval, the 10-turn Kr setup's average run time was 9 minutes, 15 seconds (expect lower run times on a road-course track).

NOVAK SUPER SPORT MOTOR AND SPEED CONTROL, TRINITY GP3300 MATCHED PACK

The Super Sport pulled 60 feet in 1.71 seconds and 120 feet in 2.78 seconds—only 1/1000 second difference on either side of the acceleration curve posted by the brushed motor. The Super Sport's top speed was an insignificant click higher at 41.66mph. It had more torque and lower rpm than our Reedy Kr 10-turn test motor but nearly identical power output, as shown by its ability to run alongside it step for step. The brushless motor was also more efficient: It clocked in about 12 percent more run time than the brushed motor (with both power systems geared to run the same speed).

The Super Sport's sensed technology made it a pleasure to drive and delivered precise throttle and linear brake control. Total braking power felt a little weak, but Novak and a number of Super Sport users say the brakes are almost too strong if you dial up the full brake setting. We rechecked the settings and found that everything was in order, so it may have been a fluke, but the brushless setup in our test car was a little less strong.

PERFORMANCE DATA	SUPER SPORT	REEDY KR 10X2/ GT7
Final drive ratio in tests	6.923:1 (72T/26T)	8.523:1 (75T/22T)
Rollout in tests	28.46mm	24.32mm
Acceleration (60 ft.)	1.71 sec.	1.72 sec.
Acceleration (120 ft.)	2.77 sec.	2.78 sec.
Distance @ 1 sec.	24.75 ft.	24.6 ft.
Distance @ 2 sec.	75.95 ft.	75.6 ft.
Distance @ 3 sec.	133.61 ft.	133.17 ft.
Distance @ 4 sec.	193.66 ft.	192.76 ft.
Maximum speed	41.66 mph	41.23 mph
Motor/speed control avg. temps	200/242 deg. F	247/143 deg. F
Average run time (min.,:sec.)	10:22	9:15
SPECS COMPARISON	SUPER SPORT	REEDY KR 10X2/ GT7
Weight (ESC & motor)	9.81 oz. (278.1g)	8.25 oz. (233.9g)
Motor diameter	1.41 in (35.9mm)	1.41 in (35.9mm)
Motor overall length (not including wiring)	70mm	67.8mm
Magnets	Neodymium	Wet-pressed ceramic
Motor-shaft diameter	.125 in. (3.18mm)	.125 in. (3.18mm)
Total cost*	\$250	\$210
*Prices vary with dealer		

Both systems were pushed to their performance limits, and the Reedy motor temp was almost 250 degrees at the end of each run; the Super Sport speed control ran slightly cooler at an average 242 degrees. The Novak system, as advertised, delivers a moderate increase in efficiency (about 12 percent in our testing). If, however, you're thinking about trading that additional efficiency for speed by gearing the brushless motor up ever further, you might exceed its limits; the same is true if you have a similar brushed-motor setup and want to push it faster. We think both systems would have suffered an unacceptable loss of performance or would even have shut down if they had been pushed any harder.



The acceleration curves of the Novak Super Sport and the Reedy Kr 10x2 proved to be virtually identical once the proper gear ratios were sorted out. Even though the power delivery from each motor is notably different, they have very comparable power output as evidenced by their performance.

How we tested the Super Sport system

Novak compares the Super Sport's performance to that of a 10-turn brushed motor, but because no commercially available RC motor dyno is compatible with brushless motors, real-world, in-car driving is the only way to test the Super Sport (and probably the best way: when was the last time you raced a dyno?). We used a Team Associated TC3 touring car for head-to-head tests of the Super Sport system and a 10-turn brushed motor setup. The TC3's 4-wheel-drive and its superior grip under acceleration made it the ideal test bed.

For acceleration tests, we ran foam tires (for maximum grip) on a very large, freshly paved parking lot, and we used a Stalker ATS radar system to get the numbers. To test run time, we ran the TC3 on an oval course with rubber tires (for consistency), accelerating and braking hard on every lap. The oval course ensured more accuracy in run-time comparisons because it the chance of the TC3's running into a roadcourse board. In addition to total run time, after each run, we checked the motor's and speed control's temperature of with the industry-leading Exergen infrared temp sensor.

We first equipped the TC3 with a Novak GT7 ESC, a Reedy Kryptonite 10-turn double motor and a Trinity GP3300 matched pack. We tested the brushed motor setup using a 75T spur gear and a 22T pinion (to duplicate Barry Baker's mod-class ratio during a recent Tamiya race).

After gathering acceleration and top-speed data for the brushed setup, we installed Novak's brushless hardware and geared the car to match the brushed motor's top speed. We did this so that the Super Sport's power delivery and efficiency would be highlighted, and this is a far more revealing indicator of total performance than simply gearing the car to the moon to see which system is faster.

➤ Inside the Super Sport motor

Novak's 5800 Super Sport brushless motor is designed for applications in which conventional 540 motors would be used. Its external dimensions are almost identical to those of a 540 motor; it's just a couple of millimeters longer. The Super Sport looks longer than it is because unlike a brushed motor, it doesn't have a tapered endbell, but it should

fit anywhere a 540 motor would usually be installed.

The 5800 features three fields in the stator and two poles in the rotor—similar to the 3-pole armature/2-magnet configuration of a brushed RC motor. Three heavy-gauge wires energize the motor fields while a separate harness of six wires allows communication between the motor's sensors and the sophisticated ESC. One of the 5800's most notable characteristics is the total absence of vents. It's pretty much sealed against the contamination that typically enters brushed motors through the cooling vents their cans require.



THE SUPER SPORT SPEED CONTROL

Although completely different in function, the Super Sport ESC is similar in many ways to the GT7 controller. The programming and profile functions will be familiar to Novak faithful, but there are a few unexpected twists with the Super Sport. In addition to offering the convenience of one-touch programming for the familiar functions, it has a six throttle profiles. It also has different minimum brake levels, reverse capability (which can be enabled or disabled in any mode) and a "Sportsman" profile that limits the motor's acceleration and peak rpm. The Sportsman profile is useful for vehicles (and drivers) that can't handle its full available power, but its primary use is to serve as a "field leveler" for spec racing. By being precisely limited to exactly the same maximum rpm, the motors ensure that no driver will have a horsepower advantage.

Here's a complete list of the Super Sport's features and profiles.



FEATURES

- 4- to 7-cell input voltage
- Dimensions: 1.32x1.75x1.05 in. (w/heat sink)
- Weight: 1.7 oz. (w/out power wire)
- Variable Throttle Step Technology for the smoothest performance
- The One-Touch/Programming Button, along with a series of four differently colored LEDs, easily guides the user through the profile selection
- Industry-first Transmitter Check Mode
- Locked Rotor Detection Circuitry prevents motor, battery and ESC from being damaged
- Direct-solder wiring tabs
- Replaceable input harness
- Heavy-duty BEC
- One-Touch Set-Up

USER-SELECTABLE SUPER SPORT THROTTLE PROFILES

1. SS standard (w/reverse)—unlimited rpm/acceleration
2. SS standard (forward/brake)—unlimited rpm/acceleration
3. SS high (w/reverse)—SS STD with higher minimum brake
4. SS high (forward/brake)—SS STD with higher minimum brake
5. Sportsman*—w/reverse; limited rpm/acceleration
6. Sportsman*—forward/brake only; limited rpm/acceleration

➤ Is brushless better?

Novak's Super Sport is an excellent motor and speed-control system that's clearly capable of keeping pace with a strong 10-turn modified motor (as Novak promised) while producing longer run times. And since the motor is almost totally sealed and doesn't have any parts that wear out, it doesn't require any maintenance.

On the downside, the Super Sport isn't yet legal for sanctioned racing because the organizations that make the rules have yet to address the issue of brushless motors. There's nothing to stop your local track running a brushless class, though. If anything, the Super Sport system

is has more appeal for local racing, since the Sportsman profiles make it so easy to ensure that all drivers have the same horsepower.

Cost is another issue: the Super Sport system costs about \$40 dollars more than the Reedy motor and Novak GT7 speed control. But there are hidden costs to a brushed motor setup: to keep the motor in top condition, you'll have to buy brushes and a comm lathe (or pay to have the comm trued), and you'll eventually have to replace the armature. Once you've installed the Super Sport system, you've finished spending money on it. ■



Apply Decals like a Pro

Sticker quicker!

by John Howell

You've spent all that time and effort building your new car or truck. You spent hours properly setting up your airbrush and compressor ... or at the very least, you've spent precious minutes cutting open the lid on that new can of Pactra. Well, now is the time to finish the job properly. That's right; it's time for some decal schoolin'!

1



CLEAN THAT BODY

We'll skip the shower jokes and focus on the task at hand. If residual oil or other goop remains on the exterior of your body shell, the decal most likely won't adhere properly to its surface. Clean the body's exterior with soap and water, or use a bit of denatured alcohol on a lint-free rag or cloth (paper towels can leave lingering lint on the body). And don't use motor spray on the body! For one thing, it can fog the Lexan, and for another, certain motor sprays contain traces of lubricant, and you obviously don't want any residual lube on the body.



2



CUTTING DECALS

Cutting out decals can be a major task. If you have a highly complex decal job ahead of you (for example, almost any Tamiya kit), it's best to do the cutting in the order mandated by the instruction manual. Don't fool yourself into thinking that you'll save time if you cut them all out at once! Follow the numbers, and apply them in the order specified.

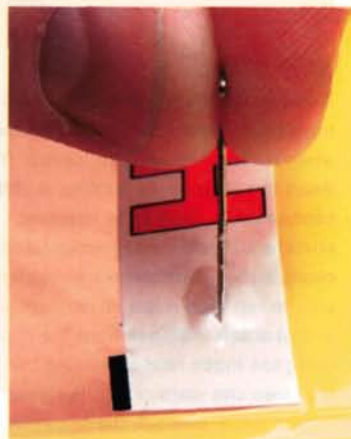
When it's time to cut out your decals, be sure to use a sharp hobby knife or curved Lexan scissors. Most people prefer Lexan scissors because it's easier to cut around decals' contours. Regardless of your preference, your scissors must be sharp; dull blades can easily butcher the material's edges, and the result will be a decal that peels off easily whenever it rubs against anything.

Some people prefer to use hobby knives to cut decals. With this tool, it's easy to use the blade's tip to trace around the edge of the decal very closely. Also, when you use a hobby knife, you don't have to cut through a maze of decals on the sheet to get to the one you want. It takes a little more hand/eye coordination and practice, but cutting out decals with a hobby knife is the preferable method.



AIR BUBBLES

Ah, yes—the dreaded air bubble! When you apply large decals, be very careful not to trap air underneath. If you do have some pesky air bubbles and you don't want to peel off the decal to get rid of them, prick them with a pin. Then heat the air bubble with a hair dryer and slowly "skim" the top of the decal with the edge of a credit card to push out the air.



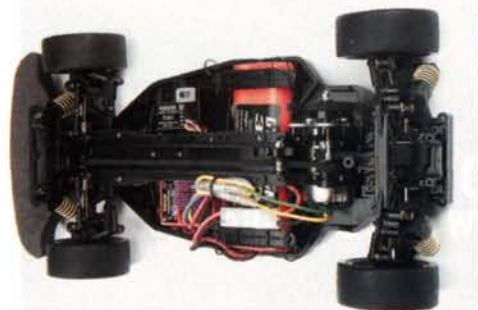
3



4

WRINKLES

During complicated decal applications (for example, wrapping one around a fender), you may encounter a nasty wrinkle. It's inevitable; even the best in the business occasionally get wrinkles in their decals. If you get a bad wrinkle around a curve or along a decal's edge, make a very small slice in the middle of the wrinkle with a hobby-knife blade. You'll also want to hit the area with a hair dryer to aid in smoothing out the wrinkles as you apply pressure to the cut section.



STAR CAR

The star of this how-to is Tamiya's ABT Audi TT-R DTM. The kit includes two bodies; one is molded in regular-weight Lexan, and the other is a "lightweight" version made of thinner Lexan. Decals are included to re-create the Halleroder and Red Bull livery, as shown on the opening page, and single-color paint jobs make it easy to get the look. The chassis is a TA-04 SS—the short-wheelbase version of Tamiya's dual-belt tourer. Ball bearings, steel turnbuckles, a 540 motor and mechanical speed control are included.

5

HAIR DRYER

As we've mentioned throughout this how-to, the hair dryer is an invaluable tool when it comes to applying decals. If your decal has trapped air bubbles or difficult contours that need to be wrapped, stretched, or otherwise manipulated into place, a hair dryer can work wonders. Be sure to run it on a low or medium setting and at a safe distance from the decal; using too much heat or holding the dryer too close can warp or ruin the decal. Worse, it can damage the Lexan itself.

When using the hair dryer, smooth and form the decal with your fingers as you apply the heat. It's amazing how well decals conform to the body with a little added heat. In addition, if you find that you have to peel off a sticker and reapply it, using a hair dryer can help reactivate the adhesive.



There you have it! With these tips, you should be detailing and decaling your new ride more easily than ever. Just remember: when it comes time to apply your decals, take your time and keep your cool. It can be frustrating when you're up until 1 a.m. positioning a huge decal on the hood of your new car, only to have it look like a jigsaw puzzle gone bad! Take your time, follow these tips, and pretty soon, you'll have the baddest-looking ride on the block.

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Trick truck stuff! New gear for a faster, tougher, better looking flatbed

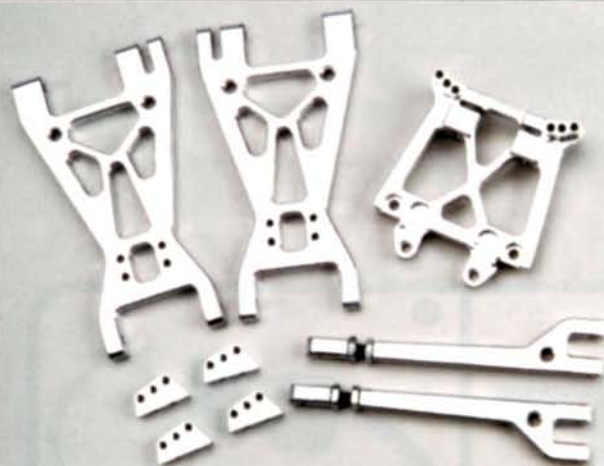
The monster-truck craze is reaching new levels, and there's no sign of the aftermarket craze slowing down anytime soon, either. In this installment of "4x4," I've gathered the latest truck products—items that should interest even hardcore truckers who think they already have everything. Enjoy!

ROBINSON RACING STEEL T-MAXX TRANNY GEARS

When the T-Maxx exploded onto the scene, Robinson Racing was there with a complement of transmission hop-ups. It offered hard-anodized-aluminum versions of its forward primary gear and forward-only gear kit. These options worked fine with the stock .15 engine, but as the popularity of .21 conversion kits grew, the aluminum gears had a hard time holding up to the big engine's power. Robinson now offers the gears in hardened steel, which may be a little heavier than aluminum but will never wear out.

Forward primary gear—item no. 8529; \$21.50.

Forward-only gear kit—8586; \$28.50



NEW ERA MACHINED HPI SAVAGE PARTS

New Era gets major points in my book for these HPI Savage parts. The Savage has only one shock-mounting position, so the only way to tune the damping is to change the shock oil or springs. Thanks to New Era's new shock tower, you can now have more ability to adjust. The tower is machined out of solid billet-aluminum, and there are three positions in which to mount the top of the shocks. Want even more adjustment? Add New Era's billet-aluminum lower suspension arms into the mix. The arms also have three mounting positions.

It would also be nice to be able to adjust camber, but the stock truck has fixed-length upper arms. For all those adjustment freaks out there, New Era again stepped up to the plate. Its upper arms are machined out of aluminum and feature threaded rods that allow you to change the lengths of the arms. Two nuts are used to lock down the various parts to prevent them from changing position. The shock tower is sold as a single unit, and the lower arms and upper links come two to a package. The parts can be shined up nicely with a little aluminum polish.

Shock towers (F/R)—HSV336SD; \$29.50 each.

Lower control arms—HSV333SD; \$39.50/2.

Adjustable camber links—HSV332A; \$29.95/2.

GOLDEN HORIZONS TAMIYA TXT-1 ALUMINUM DIFF HOUSING

Most of the Tamiya TXT-1's weight is in its axles, and the diff housings have a lot of mass. Not only does this make the truck heavy, but it also increases the drive train's rotating mass. Well, if you're looking to reduce your TXT-1's overall weight, Golden Horizons has a set of diff housings for you. They are perfectly machined out of lightweight 7075 billet-aluminum. Amazingly, they're 52 grams lighter than the stock units, and they come one to a package.

TXT-1 aluminum diff housing—GH1212; \$19.99 each.



FULL FORCE RC GRAPHITE RECEIVER MOUNT

A lot of guys race their Traxxas T-Maxxes, and they know that when you race, it's good to shed every bit of unnecessary weight. As you know, the receiver and battery pack are housed in plastic boxes to keep dirt at bay. These boxes aren't necessary when you're on the track, so if you want to get rid of them, the Full Force RC's new carbon-fiber receiver mount is for you. Install it in place of the stock receiver box, and you'll be able to stack the receiver battery and receiver in the same place.

Carbon-fiber receiver mount—FFo60; \$22.



HARDCORE RACING COMPONENTS HPI SAVAGE CHASSIS

Hardcore manufactures some of the nicest aftermarket components in the industry and is now focusing on the HPI Savage. Its latest project is this sweet-looking chassis for the big truck. The direct-replacement part is perfectly machined out of titanium and is available in blue, purple, green and silver finishes.

Hardcore Savage titanium chassis—HCR-01731 (blue), HCR-01732 (green), HCR-01733 (purple), HCR-01734 (silver); \$99.



MIP 2.5 T-MAXX UPGRADES

MIP is known for its CVD drive shafts. It now offers longer ones for the 2.5 Traxxas T-Maxx. The new drive shafts are covered with MIP's durable shiny coating. The joints operate smoothly, and the shafts are completely rebuildable.

MIP 2.5 Maxx CVDs—1525; \$99.



MAXIMIZER PRODUCTS DIFF CUP AND MOD RING GEAR

There are plenty of hop-up gears available for the Traxxas T-Maxx, and here's one more. Plastic diff housings are potential sources of trouble. They could melt and fail if the diff is overworked. Maximizer Products now offers a machined, 7075 billet-aluminum diff housing to replace the plastic one. Larger, stronger 3mm screws hold the hardened-steel ring gear in place, and a hardened-steel pinion gear is included with the diff.

Diff cup and mod ring gear—2321; \$54.95.



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Revolution HP-CR.....	100	59
HP-C Deluxe	210	119

PAASCHE

H Set (SINGLE ACTION)	\$77	\$42
VL Set	110	59

BADGER

	RETAIL	BEARAIR
Sotar 20/20	\$395	\$129

RICHPEN

	RETAIL	BEARAIR
013G (SINGLE ACTION)	\$157	\$57
GP-1	328	164

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VAN'S INVENT INC. MAXX BODY BOLTS

Monster trucks are heavy, and when you beat on them, the body clips have a hard time holding up to the abuse. They either bend or pop off, and then your body flaps in the wind. These new body mounts will hold your body on, even during a nuclear blast! The multipiece system is constructed of billet-aluminum. The body is sandwiched between the body posts and aluminum caps that hold it in place. The caps are keyed to the body posts; simply twist them 1/4 turn to lock them. You have to drill the body-mounting holes precisely for the body mounts to line up properly. Van's includes four body-mounting guides to help you position the holes. Two versions are available: one for the E-Maxx and one for the T-Maxx. A large T-handle Allen wrench to install and remove the aluminum caps is also included.

RC Body Bolts—\$134.40 (T-Maxx), \$131.85 (E-Maxx).



RADIO CONTROL MONSTER TRUCK

MADNESS



RC Car Action will hold a monster truck race this summer at RC Madness in Enfield, CT. C'mon out; you'll have a good time!

There will be several racing classes, including small-block, big-block, E-Maxx and Clod Buster/TXT-1. We'll also have extra events such as rock climbing, fastest lap, a step-up competition and, of course, concours. It's happening on July 25, 26 and 27. Friday will be open practice; Saturday and Sunday will be race days. If you want to sign up, check out the race ad in this issue, or visit rcaraction.com. I don't know about you, but I'll be there. If you don't plan to race, come on out anyway and check out the action!

SOURCE GUIDE

FULL FORCE RC; fullforcerc.com.

GOLDEN HORIZONS ENTERPRISES CO. LTD. (604) 331-2526; ghhobby.com.

HARDCORE RACING COMPONENTS (661) 294-5032; racinghardcore.com.

MAXIMIZER PRODUCTS (406) 755-2828; maximizerproducts.com.

MIP (626) 339-9007; miponline.com.

NEW ERA MODELS (603) 888-4453; neweramodels.com.

ROBINSON RACING PRODUCTS (209) 966-2465; robinsonracing.com.

VAN'S INVENT (866) 343-IDEA; vansinvent.com.

5-Step engine cleanup

It's amazing how many of us expect our engines to run well no matter how we neglect them or how dirty they may be. Not only is it difficult to see broken and loose parts through dirt, but a filthy engine is also just plain ugly. If you haven't been able to see your crankcase or carburetor in months because of a filth buildup, this article is for you.



When it comes to engines, dirt is the root of many evils. This one is relatively clean; the dirtier an engine is, the more problems it will have.

1 DE-GUNK IT! Engines and exhaust systems run best when they are clean. A clean engine dissipates heat more effectively (baked-on grime retains power-robbing heat), and it's easier to solve a problem when your engine is clean because you can actually see its components. If your engine runs poorly and is so dirty that it looks as though you dipped it in chocolate and rolled it in sawdust, don't bother to troubleshoot. Get cleaning!

■ First, remove your engine from your vehicle, and then use an old toothbrush or a stiff-bristle paintbrush to rub away as much grime as you can. Aerosol nitro cleaners work well as long as the gunk buildup hasn't been left for so long that it's baked onto the engine like armor. Before you use the cleaner, remove the air cleaner and the exhaust header, and stuff little wads of paper towel into the engine openings. Next, slide a thin rag between the flywheel and the front bearing, wrapping it around the flywheel to protect the front bearing (an old Ron Paris tip). Spray the engine liberally with nitro cleaner, and wipe away the excess cleaner with paper towels and your trusty old toothbrush. Using paper towels and a brush, clean your engine, reinstall the air filter and the exhaust, and remove the rag from the flywheel.

■ So far, so good. If your engine or exhaust has been dirty so long that the gunk has baked and become varnish, disassemble the engine and use an RC nitro cleaner (Trinity's Nitro Blast, for example) to loosen and remove this varnish. If your engine needs more help than nitro spray can provide, try Gunk, which is an automotive engine cleaner. If you have to resort to something even stronger, wear rubber gloves and eye protection, and be aware that really aggressive cleansing agents may strip off any coatings your engine has (goodbye, anodizing and paint); these products are best reserved for raw aluminum. But if you've allowed your engine to get so dirty that milder products don't work, really strong cleaners may be your only option to restore your engine's performance and looks.

Dirt and grime build up around the glow-plug opening and can easily fall into the engine when you remove the glow plug, so always clean this area before you remove it.



2 CLEAN GLOW-PLUG AREA. You'd never intentionally dump dirt into your engine's combustion chamber, would you? For this reason, before you remove the glow plug from the cooling head, you must thoroughly clean the area around it with motor spray. If you don't, you risk allowing the dirt that has collected around the glow plug to drop into the combustion chamber.

This maintenance "trick" isn't difficult or time-consuming, so be one of the few who take the time to clean this area before you remove the glow plug. If your engine runs poorly and you plan to install a new plug to fix this, clean the glow-plug area first. At the end of a day of running, allow your engine to cool completely, and then clean the area around the glow plug before you drop after-run oil into the glow-plug hole. (You do use after-run oil, don't you?)

3 REBUILD THE CARBURETOR. Many of us rebuild our engines with replacement parts for everything except the carburetor. These engines are usually the ones that are hard to tune and never seem to hold a "good tune" if you do manage to tune them. If your engine still has good compression, your carb's O-rings may be causing the problem. These small, rubber O-rings on the needle valves serve a dual purpose: they seal the needles against air and fuel leaks, and they provide the resistance against their housings that's required to keep the needle-valve settings stable while you drive the car. \

■ First, turn each needle with a screwdriver to check for resistance. Do the needles feel loose and offer hardly any resistance when you turn them, or are they very difficult to turn? If they feel loose, the O-rings have worn out; replace them. If a needle is hard to budge, its O-ring has probably torn and is binding up the threads. In either case, your carb may have an air leak or a fuel leak and simply needs a rebuild.

■ Some engine manufacturers offer engine-sealing kits. The kits typically include every seal you'll need for the carb, and some have other engine seals, too. If you don't find all the seals you need in one package, check your engine's manual for the individual O-rings' part numbers, and order them from the manufacturer. O-rings are cheap, and replacing them is an affordable fix for carb leaks and erratic engine performance. This is the most overlooked area of maintenance, yet it may be the one thing that makes a difference between running a temperamental, difficult-to-tune engine and one that's a breeze.



Torn or worn-out carb O-rings are often overlooked, but they can be the cause of an engine running poorly. Complete O-ring kits are available for carb rebuilding. Installing new seals might be a solution if you have an engine that you can never seem to tune properly.

4 SEAL IT. After you've cleaned your engine thoroughly (or you'll contaminate inner areas) and replaced any worn carb parts, seal certain areas to further protect it.

Sealing takes only a few minutes, and it can save you hours of frustration later. Take the engine out of your vehicle, and remove its carb and backplate. I recommend a high-temperature, oxygen-sensor-safe automotive silicone sealant such as Permatex Ultra Copper (available in auto-supply departments of hardware stores). Use a small flat-head screwdriver or the end of a zip-tie to apply a bead of sealant around the carb neck and the backplate area. Don't apply too much; excess can easily be sucked into the engine. Reinstall the components, allow the sealant to cure overnight, and your engine will be ready to go.

A little high-temp silicone sealant can be insurance against a leak that will make the engine difficult to tune.



A hard-to-see fuel-line tear can cause havoc when you try to tune your engine, and such problems are often difficult to detect.



Stretching the fuel line often reveals holes that were previously invisible. Check your fuel tubing when it's new and then every couple of weeks.

5 REPLACE THE FUEL TUBING REGULARLY. This is yet another relatively cheap, easy-to-replace item that is often overlooked. Over time, fuel tubing is likely to crack or develop tiny puncture holes, and most bashers will run it until it fails. Unfortunately, a leaky fuel tube can mimic defects such as bad needle settings and a dead glow plug, so it's difficult to track down the cause of the problem. Incorporate fuel-tubing replacement into your engine-maintenance routine, and you'll avoid problems. When you route the fuel tubing, keep it away from moving gears and drive shafts, and the fuel-delivery and pressure lines should not be longer than 10 inches. Excessively long fuel tubing can be kinked easily, and this will starve your engine of fuel.

No one can expect an engine to perform well forever, but good maintenance can help you to avoid poor performance caused by negligence. Simple maintenance steps such as the ones outlined here will quickly become a habit if you do them regularly. Don't be that guy with the filthy "mystery engine"; keep your 2-stroke clean for better performance and easier problem-solving. ■

If you're particularly cautious, you may want to add extra lubricants to your fuel as additional insurance against wear. Use our simple formula to determine how much lubricant you should to obtain the result you want.

1 Gallon
**RACE
3000**
30% Nitro

11% Lubrication



TECH & A

Q My local shop only carries my favorite fuel's "race" blend, which only has 10 percent oil. I worry that if I run this fuel too much, my engine will wear quicker than it would if I used a regular fuel blend with 12 or 14 percent oil. I've been told that I can add oil but that it isn't smart to do that because manufacturers deliberately use a certain oil percentage. Will adding oil to my fuel hurt anything, and if I can add oil, which oil should I add and how much? [email]

A You can add oil to your fuel if you want a longer engine life. There is a direct relationship between engine life and fuel-oil content, and it's simple: more oil equals more lubrication equals a longer engine life; with the downside is a decrease in performance.

If you'd like to bump up from 10 to 14 percent oil, pick up some Klotz BeNol racing castor oil. The basic formula for adding oil to fuel is:

(final oil percentage desired - initial oil percentage) x ounces of fuel you are treating* (128 fluid ounces equal 1 gallon)

divided by (100 - final oil percentage desired) = ounces of oil to add (*This formula works whether you deal with fluid ounces or with metric measurements.)

$$(14 - 10 = 4) \times 128 = 5.9$$

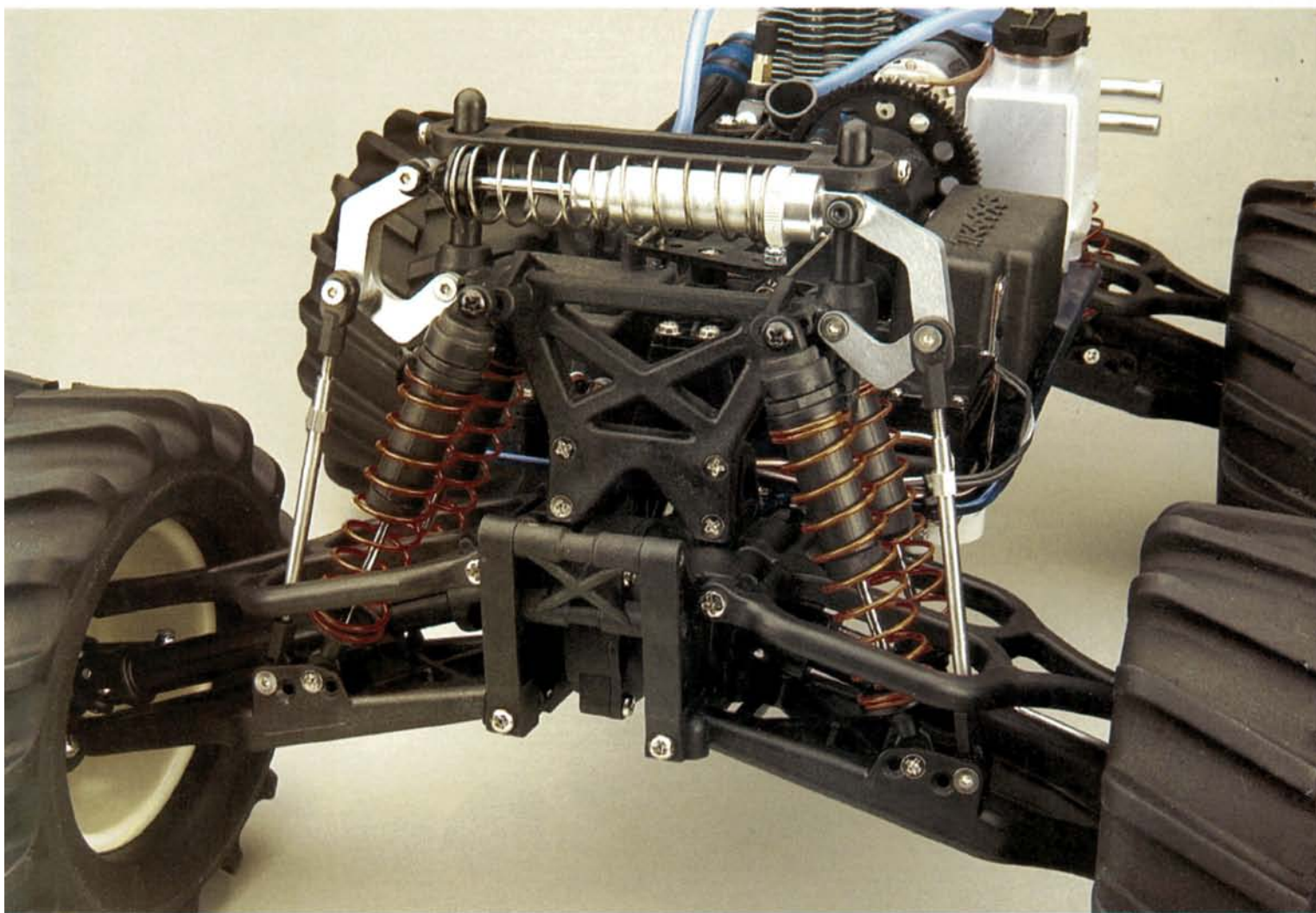
$$(100 - 14) = 86$$

So, if you want to bump your gallon of fuel up from 10 to 14 percent oil, add 6 ounces of BeNol to your fuel, and shake it well to mix it. The extra castor will provide better lean-run protection and increase your engine's life.

Remember, however, that an engine run overly lean can be damaged no matter how much oil you use, so there's still no replacement for a proper tuning.

SOURCES

KLOTZ SPECIAL FORMULA PRODUCTS INC. (800) 242-0489; klotzlube.com
TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.



RC TRIX AfterShock

RC TRIX CLAIMS THAT ITS AFTERSHOCK SYSTEM “dramatically improves your truck’s handling and suspension” and that it was designed to be “the ultimate solution for high-speed turning,” and it “gives a massive improvement in handling both before and after those big-air jumps.” When a company makes such bold claims, we just have to check to see whether the claims stand up to the test, and there’s only one way to find out!

The AfterShock is designed to stiffen suspension without altering a vehicle’s ride height. This effectively reduces the risk of roll-overs—especially at speed. You can install one shock on each tower (front and rear) or two shocks on each tower. We chose to run a single AfterShock on the front and rear.

Installation was straightforward; we only had to slightly “Dremel” the outer upper shock mount to accommodate the AfterShock. We’ve been told that the AfterShock doesn’t work with Hardcore’s aftermarket shock towers, but it does work on the older-style towers as well as the new Maxx 2.5 shock units.

Before we went outside to test the AfterShock with our Maxx, we noticed something. While holding the Maxx, we played around with its suspension by grabbing a wheel and checking its range of travel. One wheel cam-locked in place, as the shock cantilever system had been pushed beyond its limit.

We were bothered enough by this to call RC Trix; the folks there said that they knew about this but that it isn’t a problem when the truck is running because it doesn’t reach that extreme level of articulation. We decid-

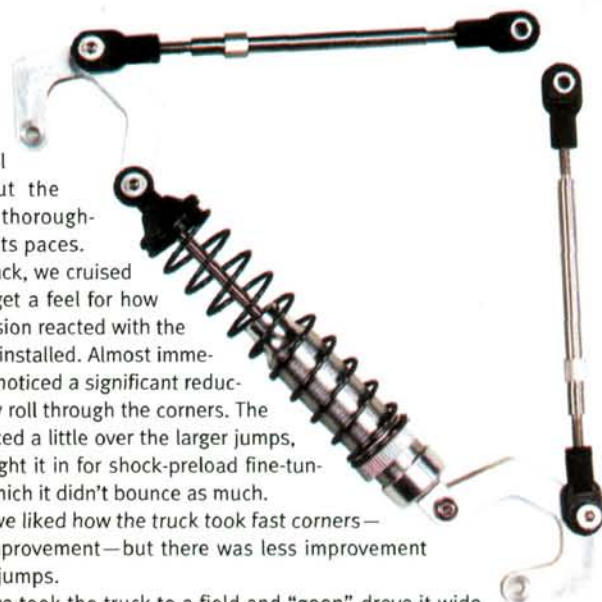
ed not to pass judgment until we had put the AfterShock thoroughly through its paces.

At the track, we cruised around to get a feel for how the suspension reacted with the AfterShock installed. Almost immediately, we noticed a significant reduction in body roll through the corners. The truck bounced a little over the larger jumps, so we brought it in for shock-preload fine-tuning, after which it didn’t bounce as much.

Overall, we liked how the truck took fast corners—quite an improvement—but there was less improvement going over jumps.

Finally, we took the truck to a field and “goon”-drove it wide open while making sweeping turns. Again, the AfterShock lived up to its manufacturer’s claims and delivered as promised. The truck felt more planted with the AfterShock, and after our initial healthy skepticism, we were pleasantly surprised. If you’d like to try the AfterShock system, it’s yours for \$52 (item no. RCT 1250CL).

RC Trix (866) 4RC-TRIX; rctrix.com.



DYNAMITE Prophet Pro and Prophet Plus Chargers

Dynamite's two new chargers—Prophet Pro and Prophet Plus—are aimed at the entry level/sport market. While the names are similar, the designs and functions are not. Let's take a deeper look.

PROPHET PLUS

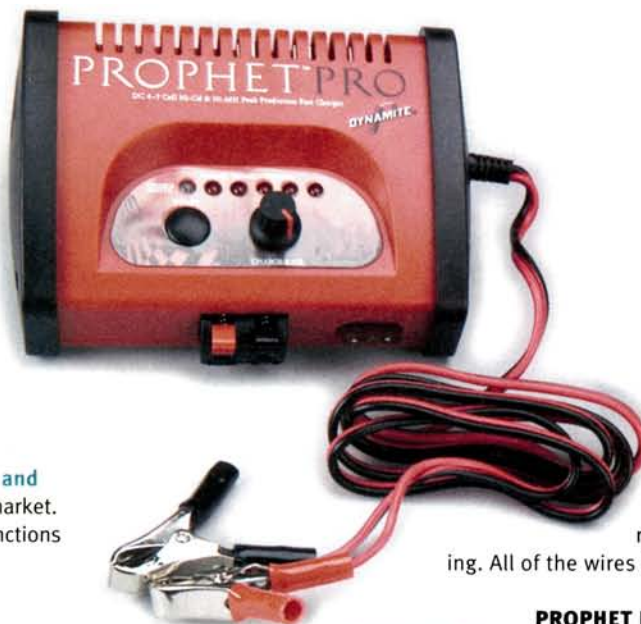
AC/DC OPERATION. Though most people will use the chargers on their workbench, the DC capability will be nice at a track that doesn't provide power. Heavy-duty alligator clips ensure that the power gets from your power source to the batteries.

TAMIYA-STYLE CONNECTORS AND RECEIVER-PACK ADAPTER. The use of the industry-standard Tamiya connector is a welcome feature for the beginner. The included receiver pack charge-lead adapter lets you charge 4- to 5-cell Ni-Cd and NiMH receiver packs.

VARIABLE CHARGE RATES. A simple flick of the switch sets the charge rate to 1, 2, or 4 amps.

ADVANCED TRICKLE-CHARGE. Once your batteries have been fully charged, the Plus enters a pulse trickle-charge that conditions the batteries and ensures that they remain fully charged when you are ready to use them. How will you know when the trickle-charge mode has begun? Your clue will be when the LED lights flash and the charger beeps.

FUSE PROTECTIONS. In cases of power spikes, the Plus is protected by a 1A buss fuse and a 7.5A spade fuse. The Pro uses a single 7.5A fuse. Dynamite provides one replacement fuse for each type (or you can buy replacement fuses at your local auto-parts supply store).



RUGGED CONSTRUCTION.

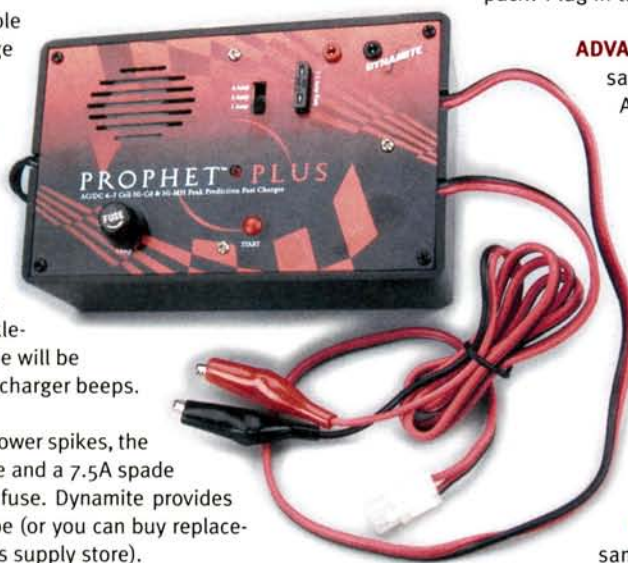
The brain of the unit is surrounded by a tough plastic casing. All of the wires felt tight and well connected.

PROPHET PRO

DC OPERATION. Just connect the heavy-duty alligator clips to any 12V power source, and you're in business.

ADJUSTABLE-CHARGE RATES FROM 100mA TO 5000mA (5 AMPS). Rather than rely on a switch for your charge rates, the Pro allows you to dial it in. The LED display provides an amp readout.

MULTIPLE CHARGE LEADS. The Pro covers all your charging needs. Need to charge your receiver pack? Plug in that lead. Tamiya-style pack? Plug in that lead. BEC-style? You know what to do.



ADVANCED TRICKLE-CHARGE. The Pro features the same trickle-charge mode as its "Plus" cousin. Again, it beeps and flashes its LEDs to let you know when you're in that mode.

SHARED FEATURES

FOUR- TO 7-CELL CHARGE CAPABILITY. You can charge 4- to 7-cell Ni-Cd and NiMH battery packs in either AC or DC operation.

NI-CD AND NIMH COMPATIBLE. When NiMH batteries first hit the scene, most entry-level chargers couldn't charge them. Now NiMH batteries are becoming standard, and it's nice that entry-level chargers can handle them.

FIVE-YEAR WARRANTY. Dynamite offers the same 5-year warranty for the Pro and the Plus.

TESTING

With both chargers out of their boxes and on the bench, we started the tests. The Plus was rock steady and straightforward from the start. Plug it in, connect the batteries, push start, and you're charging. We tested with various packs ranging from 1500 Ni-Cd to 3000 NiMH. From a fully discharged state, it took around half an hour to 45 minutes for the packs to have full juice. After charging, the packs were slightly warm, which means that they had been fully charged.

The Pro was more challenging. While it offers a wider range of charge rates, the only indication of what the charger is set at comes after you connect the power source, connect the batteries and begin the charging process. If you need 4 amps rather than 3, you move the dial until the LED display lights up with the corresponding number of lights.

We made tick marks around the dial for the corresponding rates. It

would have been nice to already have the marks around the dial, or have the dial click into detents for a specific rate. Again, as with the Plus, the batteries came off the charger slightly warm, and the charge times were similar.

THE VERDICT

Both chargers lived up to expectations. They performed solidly and were easy to use. The Prophet Plus and Pro chargers each cost less than \$50, and they are great chargers for club racers and weekend hobbyists.

Dynamite Prophet Plus/Prophet Pro chargers—item no. DYN4036/DYN4047; \$39.99/\$49.

Dynamite; distributed by Horizon Hobby (800) 338-4639; dynamite.com. ■

TEAM LOSI 4WD REPORT

4WD

THE RUNDOWN ON RACING'S HOTTEST CLASS AND WHERE THE ACTION'S AT

Track...

Intermountain Raceway

Location...

Magna, UT
(Salt Lake City)

Off-Road Race Days...

Wed, Sat

Local 4WD Hotshoe...

Steve Duncan



Track...

RC Race Place

Location...

Oklahoma City, OK

Off-Road Race Days...

Sat (Electric)
Sun (Nitro)

Local 4WD Hotshoe...

Keith Pearson



Track...

SoCal Raceway

Location...

Huntington Beach, CA

Off-Road Race Days...

Wed, Fri, Sun

Local 4WD Hotshoe...

Brian Kinwald



Track Listings...

WWW.RCCARACTION.COM/INFO/TRACK_DIRECTORY_FORM.ASP

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ALABAMA

Hobby Raceway, Tuscaloosa, Alabama 35405; Mark or Don Holt, 205-759-4517 & 205-333-8679; email: makkholt@aol.com



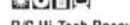
Mobile Miniature Speedway, Theodore, Alabama 36582; Richard Sweetser, 251-653-6643; email: jhogard@comcast.net; web: mywebpages.comcast.net/bogard



North Cullman Raceway, Cullman, Alabama 35055; Daniel Lofies, 256-775-2491; email: cullmanrchoobbies@yahoo.com; web: www.cullmanrchoobbies.homestead.com



Oak Mountain R/C Raceway, Columbiana, Alabama 35051; Matthew Gordon, (205) 669-6837; email: oakmtnrcraceway@hotmail.com



R/C Hi-Tech Raceway, Huntsville, Alabama 35811; Rick Chambers, 256-539-1347



Spring Cove International Speedway, Florence, Alabama 256-757-1562; email: rvines@hiway.net; web: www.springcovespeedway.com/SpringCove.htm



ARIZONA

HobbyTown Raceway, Tucson, Arizona 85713; Jay, (520) 882-8888; web: www.hobbytown.com



HobbyTown U.S.A., Phoenix, Arizona 85044; Doug McFarland, (480) 598-5282



R/C Sports Mania, Phoenix, Arizona 85017; Gary Dick, (602) 278-3671



Scottsdale R/C Raceway, Scottsdale, Arizona 85251; Scott Arlinson, 480-945-2186



ARKANSAS

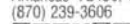
Alison Offroad RC Raceway, Little Rock, Arkansas 72206; Steve Alison, (501) 490-1227; email: jason@alisonoffroad.com; web: www.alisonoffroad.com



Grand Slam Hobby, Ft. Smith, Arkansas 72901; Bryon Shumate, (501) 648-1994; web: www.gshobby.com



Sparks R.C. Raceway, Paragould, Arkansas 72450; Tommy Sparks, (870) 239-3606



CALIFORNIA

Capital City R/C, Sacramento, California 95829; Homer, 916-383-3445; email: lanno@pacbell.net; web: www.capitalcityrc.com



Castle Hobbies, San Jose, California 95124; Steve Scott, 408-377-3771; web: www.castlehobbies.com



CCRCCC, California City, California 93505; Josh Geiger, (760) 373-2537; email: gorange@ccis.com



Crystal Park Raceway, Compton, California 90202-4925; James Reese, 310-631-0307; email: mailto:info@crystalparkraceway.com



Delta R/C Raceway & Hobbyshop, Antioch, California 94509; Rick or Steve, (925) 778-2965; web: www.deltarc.com



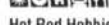
Extreme RPM Hobbies, Grand Terrace, California 92313; Bobby Haney, 909-370-3379; email: Extremepmrace@aol.com; web: www.ExtremeRPMRacing.com



Hobby Central Raceway, Poway, California 92064; Lee, (858) 513-0373; web: www.hobby101.com



Hobby World, San Jose, California 95129; Guy Bassett, (408) 873-2109



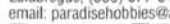
Hot Rod Hobbies, Sausalito, California 91350; Jimmy Babcock, (661) 255-2404



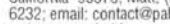
Jake's Performance Hobbies, Rohnert Park, California 94928; Jake, (707) 586-3375; email: jphracing001@aol.com; web: jphracing.com



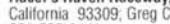
Paradise Hobbies & RC Raceway, Paradise, California 95969; David Lafabregue, (530) 877-6447; email: paradisehobbies@aol.com



Pure Adrenaline RC & Hobby, Sonoma, California 95370; Matt, (209) 536-6232; email: contact@pahobby.com; web: www.pahobby.com



Racer's Haven Raceway, Bakersfield, California 93309; Greg Cooper, 661-835-0441; web: www.racers-haven.com



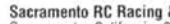
Rescue Mini R/C Speedway, Rescue, California 95672; Bruce Pease, (530) 621-3948; web: www.innercite.com/~rccracing/



Ripon R/C Speedway, Ripon, California 95366; Dan Tanis, (209) 599-5160



Sacramento RC Racing & Hobbies, Sacramento, California 95824; Andreas Muller, (916) 424-4001; email: andreas123@earthlink.net; web: www.77sunset.com



Showtime R/C Speedway, Bakersfield, California 93301; Don Risner, 661-328-1481; email: showtimespeedway@aol.com; web: www.showtime-speedway.com



So Cal R/C Raceway, Huntington Beach, California 92646; Jim or Lana, 714-963-7484; email: info@socialrc.com; web: www.socialrc.com



SpeedWorld Raceway, Roseville, California 95678; Billy Bowerman, 916-783-8864; email: speeddog@mindsync.com; web: speedworldraceway.com



The Dirt Valley R/C Racepark, Hemet, California 92544; Joe Christenson, (909) 925-7592



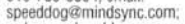
Ventura RoadRunners, Camarillo, California 93010; 805-564-4144; email: dudebigal@aol.com; web: www.venturaroadrunners.com



So Cal R/C Raceway, Huntington Beach, California 92646; Jim or Lana, 714-963-7484; email: info@socialrc.com; web: www.socialrc.com



SpeedWorld Raceway, Roseville, California 95678; Billy Bowerman, 916-783-8864; email: speeddog@mindsync.com; web: speedworldraceway.com



The Dirt Valley R/C Racepark, Hemet, California 92544; Joe Christenson, (909) 925-7592

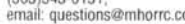


Ventura RoadRunners, Camarillo, California 93010; 805-564-4144; email: dudebigal@aol.com; web: www.venturaroadrunners.com

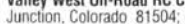


COLORADO

MHOR R/C Raceway, Aurora, Colorado 80011; Jess A. Brockman, (303) 343-0151; email: questions@mhorrcc.com; web: www.mhorrcc.com



Valley West Off-Road RC Club, Grand Junction, Colorado 81504; Jodie Grein, 970-242-1412; email: geerhed@gj.net; web: www.gj.net/~geerhed/vwrcod.html



CONNECTICUT

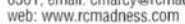
K&N R/C Speedway Inc., Stafford Springs, Connecticut 06076; Jim or Bill, (860) 684-8896



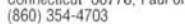
Manchester Hobbies, Manchester, Connecticut 06040; Jim or Mike Tierini, (860) 643-4768



R/C Madness, Enfield, Connecticut 06082; Christopher Marcy, (860) 741-6501; email: cmarcy@rcmadness.com; web: www.rcmadness.com



Xtreme Radio Control, New Milford, Connecticut 06776; Paul or Pete, (860) 354-4703



DELAWARE

ESRC, Seaford, Delaware 19973; Bill Auchterlonie, 302-734-2757/302-629-3944; email: aeromarine@erols.com

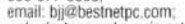


FLORIDA

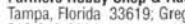
B&T RC Central, Fort Walton Beach, Florida 32547; Mike or Tim, 850-863-1666



Daytona R/C Racing Assoc., Ormond Bch., Florida 32174; Mike Wichman, 386-677-0898; email: bjj@bestnetpc.com; web: daytona-rc.homeip.net



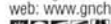
Farmers Hobby Shop & Raceway, Tampa, Florida 33619; Greg Cardone, 813-248-3314; web: www.farmershobby.com



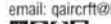
First Coast Speedway, Jacksonville, Florida 32211; Bobby Phillips, 904-716-0861; web: www.firstcoastaustracing.com



G&C Hobby Raceway, Lantana, Florida 33462; George, 561-547-3812; email: gnc hobbies2@cs.com; web: www.gnc hobbies.com



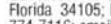
GBs Hobbies, Port St. Lucie, Florida 34952; Track Owner, 561-460-2844; email: gaircraft@bellsouth.net



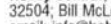
Grand Prix RC-Club, Ft. Pierce, Florida 34945; Luther Peterson, 772-473-2130; email: grandprixhobbies@aol.com



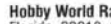
Gulf Coast RC Car Club, Naples, Florida 34105; Mark Bentfield, 941-774-7116; email: teamnofear@aol.com



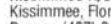
Hobby Central, Pensacola, Florida 32504; Bill McLester, 850-471-9800; email: info@hobbycentralrc.com; web: www.hobbycentralrc.com



Hobby World Raceway, Jacksonville, Florida 32210; Greg, (904) 772-9022



Kissimmee R/C Auto Racing, Kissimmee, Florida 34741; John Rosser, (407) 944-4913; email: john@craftworldflorida.com; web: www.craftworldflorida.com



Miami RC Raceway, Miami, Florida 33176; Mickey Cerra, (305) 630-3714; email: miamircraceway@aol.com



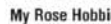
Monza R/C Speedway, Miami, Florida; Ed Delgado, (305) 437-9895



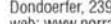
Morris Kohl's Raceway and Hobby Shop, Tampa, Florida 33604; Morris Kohl, (813) 931-1626



My Rose Hobbies & Crafts, Jupiter, Florida 33458; Mark Watson, (561) 744-3800



NORRA, Naples, Florida 34104; Rob Dondorfer, 239-417-1099; web: www.norra.mainpage.net



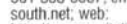
Pro Hobbies Speedway, Apopka, Florida 32712; Jim, (407) 886-4615; email: prohobby@juno.com



Sarasota RC Speedway, University Park, Florida 34201; Jim Wilson, (941) 358-7047



South Palm Beach Racers, Boca Raton, Florida 33486; Mike Fazio, 561-338-5367; email: epine01@bell-south.net; web: http://communitylink.gopbi.com/group/s/sprclub



Superior Hobby R/C Parking Lot Racing, Casselberry, Florida 32707; (407) 834-9299; email: racing@superiorhobbies.com; web: www.superiorhobbies.com



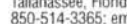
SWF RC Car Club, Fort Myers, Florida 33907; Mike Nardone, 941-278-1295; email: swfrcclub@yahoo.com; web: swfrcclub.tripod.com/swfrcclub



Tallahassee R/C Speedway, Tallahassee, Florida 32301; Tim Cook, 850-514-3365; email: idothtre@hotmail.com; web: www.geocities.com/rcduel1/rccars.htm



Tampa R/C Raceway, Seffner, Florida 33584; Carole Raimondi, 813-655-6366; email: carolehobbytown@aol.com



Treasure Coast R/C Club, Palm City, Florida 34990; Doug Goethel, 772-283-2260; email: 1tingo@gate.net

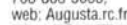


West Coast R/C Club, Lutz, Florida 33549; J.R. Sanyet, President, 813-991-0168

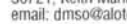


GEORGIA

Augusta R/C Racer's Club, Augusta, Georgia 30909; Darren, 706-860-5608; web: Augusta.rc.freehomepage.com



Dalton Motorsports, Dalton, Georgia 30721; Keith Manton, 706-226-6699; email: dms@alotelo.net



KEY TO SYMBOLS

	Indoor		Concrete
	Outdoor		Asphalt
	Off-road		Minis & Micros
	On-road		On-site hobby shop
	Oval		AC power
	Dirt oval		Auto lap counting
	Carpet		Food available

Hobby Town Raceway, Columbus, Georgia 31909; Frank Bastos, (706) 660-1793; email: fbastos@mindspring.com; web: www.hobbytown.com

Primetime Raceway, Calhoun, Georgia 30701; Tommy Jackson, 706-625-9037; email: primetimehobby@gccinternet.net; web: primetimehobby@gccinternet.net

SCORE-Phil Hurd Raceway, Savannah, Georgia 31406; Pat Rossiter, Club President, 912-920-2668; email: rossspeed@msn.com; web: www.score-racing.org

The Flight Box Hobby Shop, Rome, Georgia 30161-6826; Leslie Duke, (706)-234-3014

GUAM

Guahan Off-Road Racers Mangilao, Dededo, Guam 96929; Mr. Yoshimura, 671-637-8682; email: thumbtrack2@yahoo.com; web: guahanracers.net/firms.com/

HAWAII

A.S.I. Racing, Kapaa Kauai, Hawaii 96746; Arnold Morales, 808-821-8132

Radio Control Assoc./Alaa Park Raceway, Pearl City, Hawaii 96782; Ace R/C Products, (808) 456-1279

Sandy Flemings, Pearl City, Hawaii 96782; Dave Caldwell, 808-456-7272; email: info@formula1-rc.com; web: www.formula1-rc.com

IDAHO

Almosta Ranch R.C.s, Twin Falls, Idaho 83301; Casey Clements, (208) 733-8667; email: james_casey_clements@hotmail.com

Capital Dirtburners, Boise, Idaho 83702; Joe Thompson, 808-466-6334; email: internarchitect@yahoo.com; web: communities.msn.com/capitaldirtburners

DM Raceway, Pocatello, Idaho 83201; Mike Buffalo, 208-233-8163; email: dmraceway20m.com; web: www.dmraceway20m.com

ILLINOIS

AJs Raceway & Hobby, Dekalb, Illinois 60115; AJ, 815-756-2772; web: www.ajsraceway.com

C.I.R.C.A., Jacksonville, Illinois 62650; Sport 'n' Hobby, (217) 245-1375

His N Hers Hobbies Raceway, Bloomington, Illinois 61701; Kevin Turek, 309-827-0204; email: hisnhershobbies@aol.com; web: www.crashrc0catch.com/

HobbyTown USA, Oak Park, Illinois 60301; Mark or Fred, (708) 445-8056; email: htuoip@aol.com

Machesney Park Raceway, Machesney Park, Illinois 61115; Gina, (815) 282-1311; email: mpr30@aol.com; web: www.mpr30.homestead.com

Monee R/C Raceway, Monee, Illinois 60449; Roy or Roberta Moody, (708) 534-2422 (Track), (708) 799-5597 (office)

Primetime Hobbies, Tremont, Illinois 61568; Don Davis, 309-925-9999; email: staff@primetimehobbies.com; web: www.primetimehobbies.com

Radio-Active Raceway, Bolingbrook, Illinois 60440; Jim, (630) 759-7557; email: RCvolar@aol.com

Venture Raceways, Libertyville, Illinois 60048; Dale Heuberger, 219-546-3807

INDIANA

Bremen Racing Ent., Bremen, Indiana 46506; Dale Heuberger, 219-546-3807

Duneland Hobbies & Raceway, Portage, Indiana 46368; Ron, 219-763-1610; email: R1robaugh1@gmail.com; web: www.dunelandhobbies.com

Hobby Barn Raceway, Terre Haute, Indiana 47802-9694, (812) 299-5773

P&T Hobbies and Raceway, Mitchell, Indiana 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pnthobby@quest.net; web: www.pnthobby.com

Pete Russell's R/C Speedway, Elkhart, Indiana 46516; Pete Russell, 574-293-1827

R/C World of Indiana, Lynn, Indiana 47355; Joe Kolp, (765) 874-2464; email: rcworld@rcworld.com; web: www.RCWORLD.com

RC Barn, Monroe, Indiana 46772; Mark Lengerich, (219) 692-6600; email: bigdaddy@adamswells.com; web: www.rcbarn.com

RCRCR Raceway, Boonville, Indiana 47601; Scott Payton, 812-477-9661; email: spdracer@speedex.net; web: www.rcrcr.com

Schoolyard RC Speedway, Lagrange, Indiana 46761; David W. Bryan, 260-463-3558; email: dwbryan@loci.net; web: www.rcspeedway.net

Showtime Lot Racing, Fort Wayne, Indiana 46819; Mike Romines, (219) 478-6099; web: fortwaynecrpark.tripod.com/

IOWA

Ames Radio Control Speed Assoc., Ames, Iowa 50014; Ryan Davis/Brad Sandreth, 515-231-3813/515-432-0467; email: Davismotorsp@aol.com

Dubuque R/C Speedway, Dubuque, Iowa 52002; Craig Schmal, 563-587-0218; email: rccraig7@aol.com; web: www.geocities.com/tbqrc

Hobby Haven, Des Moines, Iowa 50322; Rick Marble, (515) 276-8785; web: www.hobbyhaven.com

Independence, Independence, Iowa 50644; Eugene Bachman, 319-266-3857; email: BachmanE2@hotmail.com

Iowa City R/C Racing Association, Iowa City, Iowa 52240; Hobby Corner, (319) 338-1788

IROAR-Vinton Raceway @ Vinton Roller Rink, Cedar Rapids, Iowa 52402; Ed Karr, 319-362-1291; email: bokkarhobby@aol.com

Manly R/C Club, Manly, Iowa 50456; Bruce Hill, (641) 454-2025

Marble's Raceway, Des Moines, Iowa 50317; Rick Marble, (515) 262-7507

Radio Control Raceway Park, Fort Dodge, Iowa 50501-6746; Bernie Halverson, (515) 576-3780; email: bhalverson@dodgenet.com

RiverFront Speedway, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodgenet.com

Wild Bill's Raceway, Knoxville, Iowa 50138; William Anderson, Jr., 641-842-5973; email: wildbilz@iowatelecom.net; web: www.wildbillsracing.com

KANSAS

D&B Raceway, Menlo, Kansas; Ron Ball, (785) 855-2370

KENTUCKY

Coyote Raceway, Lexington, Kentucky 40505; Danny P., 859-253-9900 or 859-253-9330; email: hyperbola01@earthlink.net; web: www.coyotehobbies.com

Dixon's R/C RaceWay, Hazard, Kentucky 41701; Jeff Dixon, (606) 436-4820; email: jeffdr1@hotmail.com

Mayking R/C Speedway, Mayking, Kentucky 41837; Jon Fields, 606-633-4700; email: jon1@se-tel.com

Pit Stop Hobbies, Paducah, Kentucky 42003; Robert or Rodney, 270-443-0052; email: pitstop1@apex.net

R.C. WOW, Falmouth, Kentucky 41040; John P. Jones, (859) 654-1700; email: rcwow@fuse.net; web: www.rcwow.com

Trio Hobbies & R/C, Radcliff, Kentucky 40160; Maurice Johnson, (502) 351-7547

Wildcat Speedway, Nicholasville, Kentucky; David Bowles, 859-272-0231

LOUISIANA

Fast Pace Hobbies, Alexandria, Louisiana 71301; Joseph or Casey Toralba, 318-561-2070; email: fastpacehobbies@aol.com

Gator R/C Raceway, Moss Bluff, Louisiana 70612; Tony Diaz, 337-855-3206; email: keithsja@aol.com; web: homepage.mac.com/kmaples/

Hwy. 44 Hobby Shop, Gonzales, Louisiana 70737; Eric Olmstead, (225) 644-1773; email: eric209@aol.com

Red Stick R/C Raceway, Baton Rouge, Louisiana 70814; Michael Pino, 225-218-1002; email: redstickraceway@aol.com; web: www.redstickraceway.com

St. Charles RC Speedway, Destrehan, Louisiana 70047; Al Cazalot, (504)764-0625; email: stcharlesracer@home.com; web: members.home.net/stcharlesracer

MAINE

Central Maine R/C Speedway & Hobbies, Fairfield, Maine 04963; David Prescott, (207) 453-4588; email: rrcracer@mint.net

Clay Bowl R/C Hobbies, Greene, Maine 04236; Pat Cap, (207) 946-5003

MARYLAND

Coles Race Way, Waldorf, Maryland 20602; Cole Brinfield, (301)-843-1386; email: kbrcinfield@cs.com

GPA Hobbies, Crofton, Maryland 21114, 301-858-0004

HobbyTown USA, Glen Burnie, Maryland 21061; David Parkinson, 410-590-4950; email: racing@mdhobbytown.com; web: mdhobbytown.com

The Track, Gaithersburg, Maryland 20877; Mimi Wong, (301) 417-9630; email: mimithetrack@yahoo.com; web: www.rctrack.com

MASSACHUSETTS

Big Boys Toys, Fall River, Massachusetts 02723; Track Owner, 508-677-9400

East Templeton Model Raceway, Templeton, Massachusetts 01468; Keith Anderson, 1-978-632-1619; email: keith@glowplug.com; web: glowplug.com

Hi-Tech Hobbies, Raynham, Massachusetts; Ruben, (508) 880-5373

Megadrome Raceway, North Adams, Massachusetts 01247; Bob Blanchette, 413-743-7223

Northboro Speedway, Northboro, Massachusetts 01532; Bob Trimble, 508-393-8087 or 393-2691

R/C Excitement, Inc., Worcester, Massachusetts 01605; Todd Anderson, 508-753-8676; email: rcexcitement@aol.com; web: www.rcexcitement.com

RPM RC Raceway, Abington, Massachusetts 02351-1094; Richard Tonetti, (781) 857-2300; email: hobbtown@AOL.com; web: www.rpmhobbys.com

MICHIGAN

D.R. R.C., Taylor, Michigan 48180; Bobby or Fred, (734) 287-7405; web: www.downriverracing.8k.com

Dirt Burner Racing, Commerce, Michigan 48390; Bill, 248-926-1140; web: www.dirtburnerracing.com

E.U.P., Kincheloe, Michigan 49788; Joel Wiggins, 906-495-3503

Fastraxx, Brownstown, Michigan 48173; Greg Yingling, (734) 379-8980; email: fast3@hotmail.com

Great Lakes Racers Club, Grand Rapids, Michigan 49588; John Warner, 616-838-2231; email: Gr8LksRacers@aol.com; web: www.rogers3.com/glr/

Hideaway Raceway, Napoleon, Michigan 49201; David Carlisle, 1-517-536-8821; email: adcarlisle1@netscape.net

Jons Hobby, Mt. Pleasant, Michigan 48858; Jon Beutler, (517)773-5412; email: jonshobby@earthlink.net; web: www.jonshobby.com

JT Superspeedway, Battle Creek, Michigan 49015; Jerry or Sam, 616-965-0116

Larry's Performance RC Carpet Track, Sterling Heights, Michigan 48314; Larry, 586-997-4840; email: lprcs@qwest.net

Lazer RC Speedway, Adrian, Michigan 49221; Russ Johnson, (517) 263-2806

N.M.R.C.C. Speedway, Gaylord, Michigan 49735; Gabe, (989) 732-3563; email: hobby-toy@voyager.net

R&L Hobbies & Racing, Portage, Michigan 49002; Rex Simpson, (616) 323-3686; web: www.rhobbies.com

R.A.C.E. Inc., Jackson, Michigan 49203; Sam Sprang, (517) 787-9161

Raw Roots Race Tracks, West Olive, Michigan 49460; Roy Bennink, (616) 399-9338

Village Hobbies, Hesperia, Michigan 49421; John Fosdick, 231-854-1374; email: vhracing@triton.net

Village R/C Raceway, Decatur, Michigan 49045; Chuck Nolke, (616) 423-7878

MINNESOTA

Country R/C Raceway Park, Belview, Minnesota 56214-8115; Charles L. Steffi, 507-641-8115

J's Radio Control Race Park, Starbuck, Minnesota 56381; Jay Campbell, (320) 239-4827

Kevin's Off-Road Raceway, Crookston, Minnesota 56716-2317; Kevin Altepetter, (218) 281-7523; email: kevin@krcrproducts.com; web: www.krcrproducts.com

National Speedway, Fridley, Minnesota 55432; Steve Hedenland, 763-571-9283; email: mrip@nationalhobby.com; web: www.nationalhobby.com

Northwoods Hobby Raceway, Brainerd, Minnesota 56401; John or Doug, (218) 829-9257

Twin Cities Hobby & Raceway, Brooklyn Park, Minnesota 55443; Mark O'Brien, 763-569-5069; email: wooduster@msn.com; web: www.twincityhobby.com

MISSISSIPPI

Meridian RC Speedway, Meridian, Mississippi 39302; Joe or Pearce, 601-483-7000

Small Cars Unlimited, Jackson, Mississippi 39212; Ed Hill, 601-372-3278; email: fast@smallcarsunlimited.com; web: www.smallcarsunlimited.com

X-Treme RC, Saucier, Mississippi 39574; Marty Capers, (228) 539-2004

MISSOURI

B&L Hobbies & Raceway, Park Hills, Missouri 63061; Bob Marler, (573) 431-9444

Hobbies in Motion Raceway, Springfield, Missouri 65803; Matthew Froning, 417-886-9621; email: mrkid-turismo@aol.com; web: www.gor-c.com

North Missouri Raceway, Chillicothe, Missouri 64601; Billy Johnston, (660) 646-1120

Novelty R/C Raceway & Hobbies, Novelty, Missouri 63460; Rex & Jena Franke, 660-739-4530; email: rex_jena@noveltyrc.com; web: www.noveltyrc.com

Ozarks R/C Raceway, Springfield, Missouri 65803; Gene Rhodes, 417-873-9350(Track), 417-742-4376(Hobby); email: OzarksRaceway@aol.com

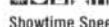
RCTRAX Racing Club of Central Missouri, Hallsville, Missouri 65255; Gary Phillippe, 573-442-8183; email: philipp74@verizon.net



Real Blue Vue R/C, Kansas City, Missouri 64133; Steve Hale, (816) 358-0238; email: hrealrc@aol.com; web: www.geocities.com/real_rc_raceway



Real R/C Raceway, Pleasant Hill, Missouri 64080; Steve Hale, (816) 540-5584; email: hrealrc@aol.com; web: www.real-rc.com



Showtime Speedway, Bakersfield, Missouri: Don Risner, (601) 203-1481

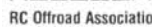


MONTANA

Garden City R/C Speedway, Missoula, Montana 59801; Brian Culp, (406) 549-7992; email: gardencityrc@msn.com



Magic City Racers, Billings, Montana 59102; Bryan Grummett, 406-656-8266; email: jsaves@tgrsolution.net; web: www.magiccityrc.com



RC Offroad Association of Racing (ROAR), Libby, Montana 59923; Jamie, 406-293-6506; email: sharkboyet@hotmail.com



NEBRASKA

Hadar R/C Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922



Hobby Town Raceway, Lincoln, Nebraska 68505; Chris or Chad, 402-434-5056; email: eaststore@aol.com



Hobby Town USA Raceway Park, Lincoln, Nebraska 68508; Chad or Chris, 402-434-5056; email: eaststore@aol.com



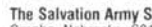
NESCAR Raceway, Grand Island, Nebraska 68801; Steve Blayney, 308-382-0920; email: spinkie@nebr.com



O.N.R.O.A.D., Omaha, Nebraska 68104; CoRK Jacobs, (402) 556-8674



OTWG Carpet Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922



The Salvation Army Speedway, Omaha, Nebraska 68164, 402-734-3414

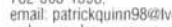


NEVADA

Dansey's Indoor R/C & Hobbies, Las Vegas, Nevada; David Lugo, (702) 453-RACE or (888) 675-8963; web: www.danseys.com



Las Vegas R/C Raceway, Las Vegas, Nevada 89139; Patrick Quinn, 702-365-1396; email: patrickquinn98@lvcm.com; web: www.lasvegascrceway.com



T-Rix bikes & R-C shop, Elko, Nevada 89801; Gary Perkins, (775) 777-8804; email: mtmman14k@hotmail.com



NEW HAMPSHIRE

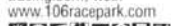
Hill Top R/C, Troy, New Hampshire 03465; Pete Bastoni/Jim MacPherson, 603-242-3222; email: hilltoprc@netze-ro.net; web: www.hilltoprc.com



Lakes Region R/C Speedway, Gilford, New Hampshire 03246; Louie Blais, 603-524-2909; email: racing@lakesregionrc.com; web: www.lakesregionrc.com



RT 106 Racepark, Pembroke, New Hampshire 03275; David Daniels, 603-224-7223; email: david@collec-tracing.com; web: www.106racepark.com



NEW JERSEY

America's Hobby Center Inc., North Bergen, New Jersey 07047; John Many, (201) 662-0777; web: www.ahc1931.com



Back Track Raceway, Hammononton, New Jersey 08037; Bob W., 609-214-5016



Checkerboard Raceways, Elwood, New Jersey 08217; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net



Family Hobbies Raceway, Vineland, New Jersey 08360; Linda Vogel, 856-696-5790; email: familyhobbies@yahoo.com; web: familyhobbiesraceway.com



Jackson RC Club, Jackson, New Jersey 08527; Al Sardino, 732-364-6422; email: Tazzyd@optonline.net; web: www.jacksonRC.com



Jefferson Speedway, Oak Ridge, New Jersey 07438; Jim, (973) 697-7525



Millville R/C Oval & Roadcourse, Millville, New Jersey 08332; William Denstoz, 856-327-4640



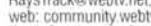
On Trax Hobbies, Browns Mills, New Jersey 08015; Joseph DiGirolamo, (609) 735-0422



PottBellys R/C Speedway, PittsGrove, New Jersey 08360; Drew Anastasio, 856-207-2495; email: pottbelly@pottbellysrc.com; web: www.pottbellysrc.com



South Jersey Cost Controlled Racing, Sicklerville, New Jersey 08081; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net; web: community.webtv.net/RaysTrack/SouthJerseyCost

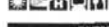


SpeedPro Dragway, Elizabeth, New Jersey 07206; Albie Niziolek, 908-351-5080; email: tunnycar176@aol.com; web: www.speedpro.org



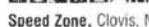
The Race Place, Farmingdale, New Jersey 07731; John Fary, (908) 938-5215

Wacky RC Raceway, Roselle, New Jersey 07203; Tony Williams or Kimble Wright, (908) 241-6700



NEW MEXICO

Albuquerque R/C Off-Road Raceway, Albuquerque, New Mexico 87120; Bill Mitchell, (505) 243-0681(W); 898-6181(H); email: email-bill@home.com



Speed Zone, Clovis, New Mexico 88101; Brad Ferguson, 505-769-1737; email: speedzone@yucca.net



NEW YORK

BarnStormers RC Raceways, Chester, New York 10918; Lou Sysma, 845-469-BARN(2276) or 469-6468; email: iamsysma@hotmail.com; web: www.barnstormersrc.com



Brennan's RC Hobbies, Vernon, New York; Bill or Tom Brennan, (315) 829-4930



Brooklyn Hobbies, Brooklyn, New York 11234; Chris Palermo, 718-951-2500; email: brooklynhobbies@aol.com; web: www.brooklynhobbies.com



Bruckner Racing, Bronx, New York 10465; Thomas Baffers Sr., (800)-288-8185



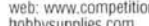
Capital District Radio Controlled Stock Car Club, Loudonville, New York 12211; Peter Willis, (518) 482-7126; email: rcpete12211@yahoo.com; web: cdrcsc/homestead.com



Chipmunk Hill R/C Speedway, Theresa, New York 13691; Ted or Pete House, (315) 628-5065



Competition Hobby Supplies & Speedway, Cohoes, New York 12047; Howie Cummings, 518-786-3622; email: howard.cummings@verizon.net; web: www.competitionhobbysupplies.com



East Coast R/C Hobbies, Brooklyn, New York 11204; John Giangrande, 718-627-3814



Fastraks, Hogsburg, New York 13655; Mark Castonguay, (518) 358-3686; email: froghobb@northnet.org; web: www.fastraks.8m.com



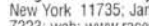
Hobby Zone Raceway, Ozone Park, New York 11417; Brian, Sean or Adam, (718) 641-9001; email: moonchaserwolf@aol.com



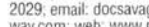
Lil Wheels Raceway, Oswego, New York 13126; Bill Meyer, 343-6566; email: lilwheelsraceway@hotmail.com; web: lilwheelsraceway.tx.org



Long Island Raceway, Farmingdale, New York 11735; James, (516) 845-7223; web: www.raceway.com



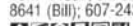
MTW Raceway, Cato, New York 13033; Tim, 888-39-HOBBY; 315-626-2029; email: docsavage@mtwraceway.com; web: www.mtwraceway.com



PRO Speedway, Cattaraugus, New York 14719; Marc Pritchard, (716) 257-3101



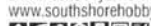
Radio Hill Raceway, Dundee, New York 14837; Bill or Greg, 607-243-8641 (Bill); 607-243-7899 (Greg)



Rampage R/C & Hobbies, Hyde Park, New York 12538; Brian Walker, (845) 229-1379



South Shore Hobby & Raceway, Coram, New York 11727; Benny or Bonnie, 631-696-8500; email: sshobby@northeast.net; web: www.southshorehobby.com



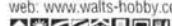
Southern Tier Raceway, Owego, New York 13827; Anita Harding, (607) 687-5395



TARMAC Ultimate R/C Raceways, Poughkeepsie, New York 12603; Todd Plass, 845-342-5409 (Todd); 845-454-8276 (Track-Sundays); email: toddp@tarmacraceway.com; web: www.tarmacraceway.com



Wall's Hobby, Syracuse, New York 13209; Bruce, 315-453-2291; web: www.walls-hobby.com



Willis Hobbies R/C Speedway, Mineola, New York 11501; Ken Ford, 516-746-3944; web: www.willishobbies.com

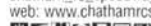


NORTH CAROLINA

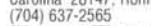
Antique Barn & Hobby Shop, Wilson, North Carolina 27893; Steve, (252) 237-6778; email: antiquebarn@esn.net



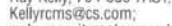
Chatham R/C Raceway, Bear Creek, North Carolina 27207; Dwight Fields, (919) 898-4518; email: chatham_rc_speedway@yahoo.com; web: www.chathamracespeedway.com



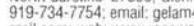
R.C.R. Speedway, Salisbury, North Carolina 28147; Ronnie Linker, (704) 637-2565



Race City Motor Speedway, Mooresville, North Carolina 28115; Ray Kelly, 704-660-FAST; email: Kellyrcms@cs.com; web: racecitymotorspeedway.com



Rosewood RC Speedway, Goldsboro, North Carolina 27530; Glenn Elam, 919-734-7754; email: gelam49@hotmail.com; web: www.rosewoodrc.com



Sandhills Raceway, Southern Pines, North Carolina; Mike Russel, 910-245-4450; email: mrmrc@mindspring.com; web: www.sandhillsraceway.com

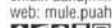


Southern R/C Motorsports Club, Shallotte, North Carolina 28459; Chris Dixon, (910) 754-6315; email: nohopec@atmc.net



NORTH DAKOTA

Grand Forks Remote Control Racers, Grand Forks, North Dakota 58201; Dan Miller, 701-746-9910; email: dandmiller@juno.com; web: mule.puah.org/gtrc

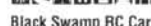


OHIO

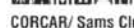
AK Hobby & Raceway, Cincinnati, Ohio 45211; Tim Tolle, (513) 661-7080; email: tim@akhobby.com; web: www.akhobby.com



American Ohio Sprint Car, Wickliffe, Ohio 44092; Gary Waldhelm, 440-944-9966; web: www.aosca.8m.com



Black Swamp RC Car Club, Toledo, Ohio 43623; Riders Hobbies, 419-843-2931; email: ridersrcclub@webtv.net; web: www.blackswamprc.cjb.net



CORCAR/Sams Club, Galloway, Ohio 43119-8732; Bill Stevenson, (614) 870-7159



D&J R/C Raceway, Orrville, Ohio 44667; Don, (330) 682-4266



DeFosse Raceway, Ripley, Ohio; Greg DeFosse, (937) 377-2063



Extreme RC Raceway, Wheelersburg, Ohio; Kevin Rowe, (740) 574-4190; email: extremerc2000@yahoo.com; web: www.ohioxc.com



Hobbyland Raceway, Proctorville, Ohio 45669; Craig Harber, 740-886-0502 or 740-8868062; email: pitrow-eracing@webtv.net; web: hobbyland-raceway.homestead.com



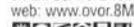
Mid Ohio Dirt Oval, Lexington, Ohio 44904; D&D Hobby Center, (419) 884-0001



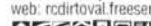
Nothing But Air R.C. Track, Logan, Ohio 43138; Gary Lloyd, 740-385-0288



Ohio Valley Off Road R/C Raceway, Jerusalem, Ohio 43747; Kevin Wilson, (740) 926-1738; email: consol@1st.net; web: www.ovor.8m.com



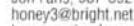
Outlaw Speedway, Lexington, Ohio, Eric Raker, 419-884-0001; email: kramerj@ao.com; web: rcdirtoval.freesevers.com



R/C Hobby, Medina, Ohio 44256; Larry Lutz, 330-723-0255; email: kohouty@aol.com



River Rat Racing, Ripley, Ohio 45167; Jon Faris, 937-392-9298; email: honey3@bright.net; web: www.riverrat-raceway (under construction)



T.S.R.C.A.R., Hamilton, Ohio 45011; Dennis Young, (513) 367-5634; email: scalerac@aol.com; web: www.tr-statercautoracers.com



TARCAR, Toledo, Ohio 43617; Bill Bridges, (419) 826-3859



Ultra Racing R/C Hobby and Track, Hamilton, Ohio 45015; Ed Lewis, 513-863-7342; email: UltraRacing@aol.com; web: www.rcaronline.com



Van Wert R/C Raceway, Van Wert, Ohio 45891; Mark Davis, (419) 232-2112



Y-City Hobby & Speedway, Zanesville, Ohio 43701; Kevin McKenna, (740) 455-3025; email: Kevin@ycity-hobby.com; web: www.ycityhobby.com

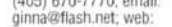


OKLAHOMA

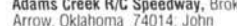
Action Hobbies, Tulsa, Oklahoma 74145; David Cole, (918) 663-8998; email: acthobii@aol.com



Action RC Speedway, Oklahoma City, Oklahoma 73135; Jerry Hawthorne, (405) 670-7770; email: ginn@flash.net; web: www.actionrc.com



Adams Creek R/C Speedway, Broken Arrow, Oklahoma 74014; John Beighle, (918) 355-1416



Competition R/C, Oklahoma City, Oklahoma 73149; James or Louise Brown, (405) 634-0809; email: com-prc1@aol.com



Enid R/C Speedway, Enid, Oklahoma 73703; Darin Pendleton, (580) 554-9400; email: darin@enid.com; web: www.enidrcracing.com



HobbyTown USA, Norman, Oklahoma 73072; Todd Jensen, (405) 292-5850



Wings N Things Raceway, Tulsa, Oklahoma 74105; Heath Anderson, (918) 745-0007



KEY TO SYMBOLS

- | | | | |
|--|---------|--|----------|
| | Indoor | | Concrete |
| | Outdoor | | Asphalt |
| | | | |

OREGON

Competition Racing Association, Portland, Oregon 97230; Mark Taylor, Pres. 503-761-1334; 503-761-0443fax; email: mark@cra-news.com; web: cra-news.com



Dirt City RC, Albany, Oregon 97321; Doug Vertrees, (541) 791-1089; email: quicktemperc@aol.com



R/C Plus Hobbies Raceway, Salem, Oregon 97302; Ron Smith, (503) 364-9188; email: rcplus@rcplus.com; web: www.rcplus.com



R/C Speed Center, Medford, Oregon 97501; Gene & Betty Jean Skelton, 541-779-8298



Rose City Scale Racing, Milwaukie, Oregon 97222; Rick Strauss, (503) 631-2929; web: www.rc-cars.com



PENNSYLVANIA

Bumps & Jumps RC Speedway, Middletown, Pennsylvania 17057; Chris McKinney, 717-728-4613; email: chrismc@bigfoot.com; web: www.bumpsandjumpsrsc.com/



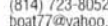
Courtview Raceway, Washington, Pennsylvania 15301; Aaron Stimmell Jr., 724-228-8396



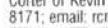
DC Ultra Trax, Warminster, Pennsylvania 18974; David Cowan, (215) 672-5200; web: www.jcrchobbies.com



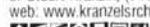
Dreamboat Hobbies, Warren, Pennsylvania 16365; Louie Dussia, (814) 723-8052; email: dreamboat77@yahoo.com



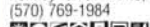
J&K Hobbies and Raceway, Jersey Shore, Pennsylvania 17740; Jason Corter or Kevin Casbeer, 570-398-8171; email: rcmaniac01@msn.com



Kranzel's R/C Raceway & Hobbies, Lemoyne, Pennsylvania 17043; David or Stuart Kranzel, (717) 737-7223; web: www.kranzelsrchoobbies.com



Little Plum R/C Hobbies, Lock Haven, Pennsylvania 17745; Larry Duck, (570) 769-1984



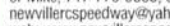
Marshall's R/C Raceway, Honesdale, Pennsylvania 18431; Bill or Dot Marshall, (570) 729-7458



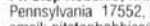
McCullough's Offroad, Sarver, Pennsylvania 16055; Doug McCullough, (724) 352-0116; email: dmccull323@aol.com; web: www.mcculloughsoffroad.com



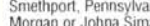
Newville RC Speedway & Hobbies, Newville, Pennsylvania 17241; Randy or Mike, 717-776-5568; email: newvillersspeedway@yahoo.com; web: www.newvillersspeedway.com



Pit Stop Hobbies, Mount Joy, Pennsylvania 17552, (717) 653-6222; email: pitstophobbies@pitstophobbies.net; web: www.pitstophobbies.net



Racers Edge R/C Racing & Hobbies, Smethport, Pennsylvania 16749; Rick Morgan or Johna Simar, (814) 887-9256; email: racersedge.rc@mindspring.com; web: www.racersedge.com



RB Motorsports & Hobby, Northumberland, Pennsylvania 17857; Rick Bunting, (570) 473-8711



RC Avenue II, Bradenville, Pennsylvania 15660; Chris Demyan, 724-537-9592; email: 12ss@msn.com



RC Dirtburners Club, Windber, Pennsylvania 15963; Bruce Schmidt, (814) 266-4118; email: rckidd1@cs.com



RC Outfitters, Hanover, Pennsylvania 17331; Chris Shaffer, (717) 633-9490; email: thestore@rcoutfitters.com; web: www.rcoutfitters.com



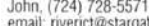
Riverside Raceway, Warren, Pennsylvania 16365; Jeff, (814) 723-4211



Staub Bros. R/C Speedway, Gettysburg, Pennsylvania 17325; Todd or Scott Staub, 717-334-8488; web: www.staubbrothers.com



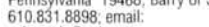
The Raceway at River Junction, Beaver, Pennsylvania 15009; Sam or John, (724) 728-5571; email: riverjct@stargate.net



Thunder Hobbies Raceway, Indiana, Pennsylvania 15701; Brent or Lori Marshall, (724)349-2639; email: thunderhobbies@hotmail.com



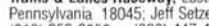
Thunder Road Raceway, Limerick, Pennsylvania 19468; Barry or John, 610.831.8898; email: xslotgdx@aol.com; web: www.towbarre.com



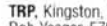
Track 84, Narran, Pennsylvania 17555; Andrew Flexer, (717) 354-6503



Trains & Lanes Raceway, Easton, Pennsylvania 18045; Jeff Setzer, (610) 253-8850 or (800) 447-4891; email: trainslanes@aol.com



TRP, Kingston, Pennsylvania 18704; Rob Yeager, 570-283-3066; email: rcrob99@aol.com



WillCam Raceway, Punxsutawney, Pennsylvania 15767; James Campbell, (814) 939-4251



PUERTO RICO

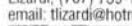
Bayamon R/C Park, Bayamon, Puerto Rico 00956; Damian Cruz & Javier Rivera, (787) 869-8092 & 401-2770; email: damian@bayamonrcpark.com; web: www.bayamonrcpark.com



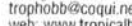
Hi-Speed C Raceways, San Juan, Puerto Rico 00926; Carlos Ortiz, (787) 283-0198; email: hispeed@hotmail.com; web: www.hispeedhobby.com



Mech Tech Touring Park, Caguas, Puerto Rico 00725; Humbert (Tito) Lizardi, (787) 739-1572; email: tlizardi@hotmail.com

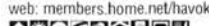


Tropical Raceway Track, Manati, Puerto Rico 00674; Hector Pabon/George Pabon, 787-785-9529; email: trophob@coqui.net; web: www.tropicalhobby.com

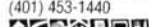


RHODE ISLAND

Insane Toys RC race track, Providence, Rhode Island 02909; Jose Jimenez, (401) 421-8878; email: Havokt@aol.com; web: members.home.net/havokt/



SK Hobbies Inc., Johnston, Rhode Island 02919; Slim or Keith, (401) 453-1440

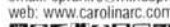


SOUTH CAROLINA

Atomic Racers, Aiken, South Carolina 29803; Bill Jackson, 706-855-0846 or 803-725-1664



Carolina R/C Speedway, Easley, South Carolina 29640; David, 864-295-1209; email: cprahr@cmlsprint.com; web: www.carolinarc.com



D&S Hobbies R/C Track, Hartsville, South Carolina 29550; Don Dietz, 843-383-0017; email: dshobbydon@aol.com; web: www.dshobbies.com



Darlington R/C Raceway at Hobbies & More, Darlington, South Carolina 29532; Jerry Pollard, (843) 393-0355; web: www.hobbiesnmore.com



Hi Voltage Raceway, Anderson, South Carolina 29625; Whitner Bowen, 1-864-225-8680; email: Jahlion247@aol.com



The Grove Racing Center, Rockhill, South Carolina 29730; Don Faris, (803) 327-4121; web: www.hobbystop.com



SOUTH DAKOTA

Boomerans Raceway, Hartford, South Dakota 57033; Ed Smithback, (605) 528-7345



Dakota Off-Road Racers, Aberdeen, South Dakota 57401; Kevin, 605-225-5223



Grassland Racers, Black Hawk, South Dakota 57718; Ryan Logan, (605) 787-5632



Triple B, Winner, South Dakota 57580; Broc Turner, (605) 842-2699



TENNESSEE

Hobby Town USA, Franklin, Tennessee 37067; Bobby Mills, (615) 771-7441; email: htu126@aol.com



MSA R/C Racing, Crossville, Tennessee 38555; D.R. Findley, (931) 456-0027



Need For Speed Raceway R/C, Chattanooga, Tennessee 37415; Ronnie Cox, (423) 876-9019



Robertson's R/C Raceway, Jackson, Tennessee 38301; Travis Robertson, 731-423-6984; email: RobertsonsRC@aol.com



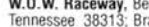
SpeedZone Raceway & R/C Hobbies, Sweetwater, Tennessee 37874; Mike Henderson, 423-351-0055; email: speedzon@msn.com; web: www.speedzonraceway.com



Statineline Village Raceway, Ducktown, Tennessee 37326; Len James, 423-496-5006; email: statelin@ellijay.com



W.O.W. Raceway, Beech Bluff, Tennessee 38313; Brad Jones, 731-427-1625; email: wowracer@hotmail.com; web: go.to/wowracing



TEXAS

215 Speedway, Abilene, Texas 79602; Clyde Gardner, (915) 673-2351



Al's Hobbies, San Antonio, Texas 78227; Alfonso Robles, 210-645-1050; email: alshobbies@usa.com; web: www.alshobbiesusa.com



Austex RC, Austin, Texas 78757; Michael, 512-458-2324; web: www.austexrc.com



B&B R/C Hobbies, Big Spring, Texas 79720; Walter Bumbulis, (915) 263-1790; email: b&brchobbies@aepx2000.net



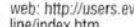
Big Mike's R/C Raceway, Longview, Texas 75604; Mike Sumrow, 903-297-7814



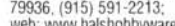
Drycreek Raceway, Greenville, Texas 75402; Micky Alphin, 903-527-5381; web: web.pulse.net/drycreek



Finishline Raceway, Hurst, Texas 76053; Damon Darnall, (972) 404-0463; email: Finishline@ev1.net; web: http://users.ev1.net/~finishline/index.htm



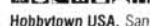
Hal's Hobby Raceway, El Paso, Texas 79936, (915) 591-2213; web: www.halshobbywarehouse.com



Hobby Center Race Track, Houston, Texas 77598; Issac Ben-Ezra, 281-488-8697; email: Hobbycenter@issac-smodels.com; web: www.hobbycenter.cc



Hobbytown USA, San Antonio, Texas 78209; Clark, (210) 829-8697; fax (210) 829-8707



Indy R/C World, Garland, Texas 75041; Steve Webster, (972) 271-4844; fax (972) 271-4502; web: www.indyrcworld.net



Js Action R/C, Pasadena, Texas 77504; Jack Williams, 713-946-8888; email: jayactionrc.net; web: www.jsactionrc.com



K&M Racing, New Caney, Texas 77357; Brent Mahaffy, (281) 399-9777



M&M Hobby Center, Bellaire, Texas 77401; Meir Ben-Ezra, 713-661-7137; email: mandm@mmhobby.com; web: www.mmhobby.com



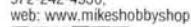
MBRC, Dallas, Texas 75093; Mike Battelle; email: info@mbrc-racing.com; web: www.mbrc-racing.com



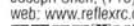
Mike's Hobby Shop Superstore & Raceway, Carrollton, Texas 75006, 972-242-4930; web: www.mikes hobbyshop.com



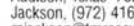
Reflex R/C, Houston, Texas 77055; Joseph Chen, (713) 464-4458; web: www.reflexrc.com



T&M Raceway R/C Drag Racing, Addison, Texas 75244; Marvin Jackson, (972) 416-0445; email: mjjackson@tmraceway.com; web: www.tmraceway.com



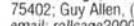
T&T R/C Cars, Plano, Texas 75024; Joe Sullivan, (972) 633-2470



The Rollcage, Greenville, Texas 75402; Guy Allen, (903) 883-0332; email: rollcage2000@therollcage.com; web: www.therollcage.com



Thompsons RC Raceway, Lufkin, Texas 75901; Mark Thompson, (936) 637-0093



W.E.S. Hobby Race, Beaumont, Texas 77701; Marty Walker, (409) 839-4929



X-Treme Hobbies, Round Rock, Texas 78664; Jef Santos, (512) 310-0444 or (512) 388-3819

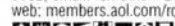


UTAH

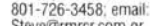
Hobbie Stop Raceway, Riverdale, Utah; Todd Hamilton or Beazer Martin, (801) 622-0841



Intermountain R/C Raceway, Magna, Utah 84044; David Mott, 801-250-8303; email: rcmother1@aol.com; web: members.aol.com/rcmother1



Outback Raceway, Ogden, Utah 84404; Steve Brown or Beazer Martin, 801-726-3458; email: Steve@rmrcr.com or Beazer@bibbs.com; web: www.rmrcr.com or www.beazershobbies.com



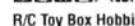
Vision Hobby, Orem, Utah 84057; Ken Rice, (801) 226-6226



VERMONT

Empire Hobbies Off-Road Raceway, Saint Albans, Vermont 05478; Scott or Jen, 877-446-2243;

email: empirehobbies@surlglobal.net; web: www.empire-hobbies.com

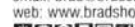


R/C Toy Box Hobbies & Tracks LLC, Saint Johnsbury, Vermont 05819; Raymond Richard, 802-748-1030; email: ray@rctoybox.com; web: www.rctoybox.com

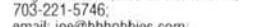


VIRGINIA

Brad's Hobbies, Staunton, Virginia 24401; Brad, (540) 885-3642; email: brad@bradshobbies.com; web: www.bradshobbies.com



Brown Brothers Hobbies, Dumfries, Virginia 22026; Joe or Bob Brown, 703-221-5746; email: joe@bbhobbies.com; web: www.bbshobbies.com



DRCW Raceway, Virginia Beach, Virginia 23454; Les Modlin, 757-340-6681; web: www.debbiesrcworld.com



Hampton Roads R/C Drag Club, Virginia Beach, Virginia 23452; Garry Nelson, 757-399-8645; email: Garry@gsdragracing.com; web: www.HRRCDC.com



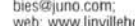
KC's Radio Control & Repair, Lynchburg, Virginia 24503; Curtis or Kim Wright, (804) 384-8596



Linville Hobbies Raceway, Linville, Virginia 22834; Jason or Jerry Shenk, (540)833-2222; email: linvillehobbies@juno.com; web: www.linvillehobbies.com



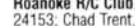
Olde Towne Hobby Shoppe, Manassas, Virginia 20110; Jeff Gough, (703) 369-1197; web: www.olde townehobby.com



Roanoke R/C Club, Salem, Virginia 24153; Chad Trent, 540-314-6257; email: roanokerc@dooleyprinting.com; web: roanokerc.cjb.net



Shamrock Raceway, Winchester, Virginia 22601; Charlie Greathouse, 540-678-8878; web: www.shamrock.homestead.com/front-page.html



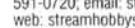
Stream Hobby Shop, Newport News, Virginia 23605; Rusty Kennedy, 757-591-0720; email: streamrc@aol.com; web: streamhobbyshop.com



The Tiltyard, Dayton, Virginia 22821; Homer, 540-828-3476; email: homer@tiltyard.com; web: www.tilyard.com



Thunder Road RC Speedway, Gordonsville, Virginia 22947; Robert Bingle, 434-296-6549; email: tripod@thunderroadrc.com; web: www.thunderroadrc.com



Tidewater R/C Speedway, Inc., Hampton, Virginia 23663

Cedarvale Raceway, Mount Vernon, Washington 98273; Craig, 360-755-9464



Fantasy World Raceway, Tacoma, Washington 98408; Dave Kleinman, (253) 473-6223; email: sales@fantasy-worldhobbies.com; web: www.fantasy-worldhobbies.com



Four Season R/C Racing, Olympia, Washington 98506; Gary and Sharon Brown, (360) 491-2430



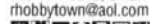
Hank Perry Raceway, Spokane, Washington 99203; Hal Hudson, 509-879-3503; email: halshudson@msn.com



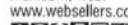
HobbyTown USA, Tacoma, Washington 98408; HobbyTown USA Shop, (253) 474-7787



HobbyTown USA, Lynnwood, Washington 98037; Rich or Jamie, 425-774-0819; email: rhobbytown@aol.com



Paradise Raceway and Hobbies, Spokane, Washington 99207; Mark, 509-483-1843; email: paradiserc@hotmail.com; web: www.websellers.com/paradise



Race City, Auburn, Washington 98002; Bruce, (253) 939-2515; email: auburn@pacifier.com



Rain City RC Raceway, Lynnwood, Washington 98036; Pete or Debbie Cartwright, 425-776-8241; email: info@raincityraceway.com; web: www.raincityraceway.com



Redmond Hobbies Raceway, Redmond, Washington 98052; Stan Ng, (425) 885-3639; email: info@redmondhobbies.com; web: redmondhobbies.com



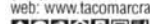
Schmidt's Auto Parts, Marysville, Washington 98271; Jon Faila, (360) 653-8838; web: www.schmidtsrccrceway.com



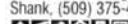
Spokane Indoor Raceway, Spokane, Washington 99212; Brian Batch, 509-487-2122



Tacoma R/C Raceway, Tacoma, Washington 98406; Scott Brown, (253) 565-1935; web: www.tacomarcraceway.com

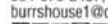


West Coast Hobby & Raceway, Richland, Washington 99352; Darren Shank, (509) 375-4995

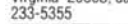


WEST VIRGINIA

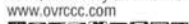
Burr Fab R.C. Raceway, West Union, West Virginia 26456; Mark Travis, 304-873-2487; email: burrshouse1@bcs.com



Fulton's R/C Raceway, Wheeling, West Virginia 26003; James Fulton, (304) 233-5355



Mountwood Raceway, Vienna, West Virginia 26105; Tom Allen, 304-295-3234; email: ray@ovrccc.com; web: www.ovrccc.com



Quiet Dell Raceway, Fairmont, West Virginia 26554; Darris, (304) 366-1441; email: Tateracing@aol.com



WISCONSIN

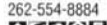
ABC R/C Inc & Raceway, Waukesha, Wisconsin 53186; Dick Mathiesen, 262-542-1245; email: Help@abcrchobby.com; web: www.abcrchobby.com



Best's Hobbies, Appleton, Wisconsin 54914; Peggy, 920-734-5244; email: appletonrc@hotmail.com; web: www.besthobbies.com



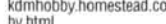
Gary's Hobby Center, Racine, Wisconsin 53403; Bill Phalen, 262-554-8884



Hobbytown USA - Revolution Raceway, Sheboygan, Wisconsin 53081; Kenny, (920) 452-0801; web: www.hobbytownsheb.com



KDM Raceway, Abbotsford, Wisconsin 54405; Kevin Michlig, 715-223-4414; email: kdmhobby@pcpro.net; web: kdmhobby.homestead.com/kdmhobby.html



MARCCA Raceways, Poynette, Wisconsin 53955; Don Hartley, 608-243-1778; email: hotrodhartley@aol.com; web: www.marcca.com



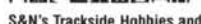
Mid-West Tri-Clone/Tri-Clone Offroad, West Bend, Wisconsin 53095; Dave Hilpert, 262-334-0429 or 262-626-2238; email: mwtrc@hnet.com; web: www.triclone.com



Pro-Star Racing, Green Bay, Wisconsin 54301; Chuck or Terry, (920) 494-1233 or (920) 469-5566



S&N's Trackside Hobbies and Raceway, Milwaukee, Wisconsin 53005; Scott Ernst, 262-783-4699; email: ernst@trackside.com; web: www.trackside.com



The Shorthall Raceway, Eau Claire, Wisconsin 54701; Scott Schoettie, 715-838-8350; email: Scottschoettie@mcleodusa.net



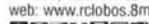
WYOMING

Xtreme Hobbies Raceway, Gillette, Wyoming 82718; Krieg Balls, 307-682-6077; email: xtreme@vcn.com



ARGENTINA

Circito R/C Lobos, Lobos, Buenos Aires 7240; Rupert Bruce, 54-02227-422905; email: rclobos@yahoo.com; web: www.rclobos.8m.com



Circuit M.R. Models, Buenos Aires 1428; Maximiliano Roballos, 54 11 4557 1000, fax 4780 1677; email: info@kyosho-argentina.com.ar; web: www.kyosho-argentina.com.ar



Club A. Velez Sarsfield, Buenos Aires; Jorge Herrero, 54-01-658-5851



AUSTRALIA

A.C.T. Model Car Racing Club, Wanniasa, ACT; Gary Davey, 61-6-2871411



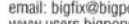
A.C.T. Remote Control Car Club, Kambah, ACT; Rob Jorgensen, 61-2-6231-9925; email: bjorgo@isr.gov.au; web: users.bigpond.net.au/gr/actrcc.html



Aubry R/C Car Club, Aubry, New South Wales 2640; Ron Langman, 060-247-128



Brisbane Dirt Racing, Brisbane, Queensland 4053; Jeff Chandler, 07 3355 7476, 041 878 3201; email: bigfix@bigpond.net.au; web: www.users.bigpond.net.au/bigfix



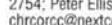
Canberra Off-Road Model Car Club, Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070



Carine R/C Model Car Club, Inc., Greenwood, Western Australia; Mitchell Davies, 0418 955 981; email: t3davies@iinet.net.au



Castle Hill Radio Control Off Road Car Club, Castle Hill, New South Wales 2754; Peter Ellis, 0412 257 353; email: chrccrc@nextcentury.com.au; web: www2.nextcentury.com.au/chrccrc



Central Coast ORCC, Bateau Bay, New South Wales 2261; Peter J. Knight, 61-43-693-698



Illawarra RCECC, Albion Park Rail, New South Wales 2527; Mel or Andrew, 042-714-683



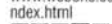
Lakeside R/C Racing Car Club, Lansvale, New South Wales 2166; R. Bartolozzi, 62-2-907-9800



Melton Electric Circuit Car Association, Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805



Monaro Radio Control Car Club, Queanbeyan, New South Wales 2902; Graham Brown, 02 6241 3070; email: gbrown@webone.com.au; web: www.webone.com.au/~gbrown/mrcc/index.html



NSW Indoor R/C Raceway, Hurstville, Sydney 2220; Anthony Lee or Walter Ly, 02-9585-8810



Penfield Park, Adelaide, South Australia 5108; Trevor UNew South Walesor, (618) 8289-5010



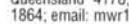
R.C. Speedway, Newcastle, New South Wales 2300; Andrew Dillon-Smith, 02-49265966



TFTF - Templestowe Flat Track Racers, Templestowe, Victoria 3106; Nigel George, see website; email: tftf@imagefile.net; web: drive.to/tftf



The Bayside Raceway, Brisbane, Queensland 4178; Nigel Bell, 07 3893 1864; email: mvr1@dingoblu.net.au



Victorian Radio Control Drag Racing Association, Melbourne, VIC 3940; John de Tracy, 03 59820459; email: bjmo1@hotmail.com; web: www.ozemail.com.au/~john59/index.html



Wee Waa's Offroad RC, Burren Junction, New South Wales 2386; Shane, 61-02-6796-1339



Wodonga R/C Car Club, Wodonga, VIC 3690; Paul Townsend, 02-6056-0706; email: townsend175@ozemail.com.au



AUSTRIA

RMC-Wien, Vienna A-1220; Herbert Holzer/Martin Hrzak, +43-664-4730376



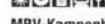
BARBADOS, WEST INDIES

R.O.A.R. (Radio Operated Auto Racing), St. Michael; Marva Clarke, (246) 427-3907



BELGIUM

ATR-Alka-Tele-Racing, Limburg; Alken, 0032-11-25-49-03



MBV-Kampenhout, Kampenhout B1910; Frank Mostrey, 0-16-65-75-18



Model Racing Club Oudenaarde (MRCO), 9700 Oudenaarde; Nicky Delmote, and fax: 32 55 30 36 25; email: mrcoc_racing@hotmail.com; web: mrcoc-racing.tripod.com



MRCZ, De Burg; Montie, 75-71-63



R.C.R., Retie 2470; A. Eelen, 32-14-379685



BRAZIL

AGARC Associaçã o Goiana de Automodelismo Radiocontrolado, Aparecida de Goiânia, GO 74980-070; Zeca, Carol, Warner or Rodrigo, 062 9979 9009; email: zeca.net@terra.com.br



Amoc Cassociaçã o de Modelismo B. Cambario, Bal. Cambario, South Carolina 88 330-000; Leo Cesar, (047) 366-0001



Brasília R/C Motor Circuit, Brasília, DF 70000; Alexandre (Alex), 55-061-273-7205



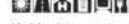
C.A.A.R. Curitiba Associacão de Automodelismo Radiocontrolado, Curitiba, Puerto Rico 82650-530; Ronaldo Assumpcao, 55-41-354-2804



Electric Car Club R/C Santos, Santos, Sao Paulo 11065-001; Estevarn or Arnaldo, 55-013-232-2536



Hobby Center, Brasília, DF 70.273, 061-242-0488



Hobby Planet Racing Club, Campinas, Sao Paulo 13091901; Daniel, Helio, Luciano, 019 258 2768



Jungle Drive, Rio de Janeiro, PB 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449



Off Roaders, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931

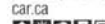


CANADA

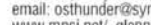
ATN, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097; email: durand@sogetel.net; web: public.sogetel.net/ldurand/



C.A.R.C.A.R., Calgary, Alberta; Kerry Nevalte, 403-630-8852; web: www.car.ca



Cactus Speedway, Ruthven, Ontario N0P 2G0; Terry Torell, (519) 735-7122; email: osthunder@sympatico.ca; web: www.mnsi.net/~glen/sparc.htm



Cam R/C, Coquitlam, British Columbia V3E 1K9; Roger Brown, 604-945-3888



Circuit J.C., St. Polycarpe, Quebec J0P 1X0; Jean Castellon, 450-265-3675



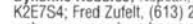
Circuit Teleguide ST Roch, ST Roch De L. Achigan, Quebec J0K 3H0; Gerald Beauchamp, 450-588-4254; email: gedoroam@colba.net; web: www.grcsr.com



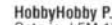
Copetown Raceway, Copetown, Ontario; Adam Filipowicz; email: adamfilip@home.com; web: www.grcsr.com



Dynamic Hobbies, Nepean, Ontario K2E7S4; Fred Zufelt, (613) 225-9634; web: www.members.home.net/rcot-tawa



HobbyHobby P.L.R.C., Mississauga, Ontario L5M 1K8; Tom Bakonyi, 905-858-7978; email: info@hobbyhobby.com; web: www.hobbyhobby.com



Honda House Motor Speedway, Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



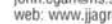
IROCC, Victoria, British Columbia V9B 5W9; Daryl Jones, (250) 478-8013; email: dbjones@shaw.ca



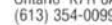
Johns Jump & Grind R/C Track, Waterville, Nova Scotia B0P 1V0; John Egan, 902-538-8920; email: john.egan@ns.sympatico.ca; web: www.jagrc.com



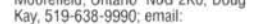
J-T International Raceway, Nananee, Ontario K7R 8A1; N. O'Neill, (613) 354-0099



Kays Hobbies R/C Raceway, Moorefield, Ontario N0G 2K0; Doug Kay, 519-638-9990; email: dougk@golden.net; web: www.kayshobbies.place.cc



Leading Edge R/C Speedway, Kingston, Ontario K7M 3Y5; Mike and Tony Daicar, 613-389-4878



Mid-Canada R/C Auto Racing, Winnipeg, Manitoba R2J 4E6; Jason McBride, 204-231-3324; email: hjmcb@escape.ca; web: www.geocities.com/midcanadaracrautoring



Miniatures & Passions, Ste. Therese, Quebec J7E 2B4; Gilles Lachance, (450) 979-7989



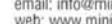
Mini-Z Hobby Shop, Markham, Ontario L3R 0W4; Brian Pong, (905)940-0898; email: info@minizhobbyshop.com; web: www.minizhobbyshop.com



Prince George Radio Controlled Car Club, Prince George, British Columbia V2M 5R9; Doug Waller, 250-561-0035



R/C Champ Raceway, Scarborough, Ontario M1H 3A4; Ben, Matthew or Louie, (416) 289-8717; web: www.rcchamp.com



R/C Fanatic, Charlesbourg, Quebec G1G 3Y4; Marc Page (Club President), 418-265-2678; email: info@rcfanatic.com; web: www.rcfanatic.com



Recreation R/C Raceway, Prince George, British Columbia; Doug Waller, (604) 561-0035



Steeltown Speedway, Binbrook, Ontario L0R 1C0; Trevor Harrison, 905-692-3407 (ask for Trevor); email: the_prodigy@znetonebox.com; web: www.geocities.com/s_speedway



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Sudbury Organized Auto Racing, Val Caron, Ontario P3E 1E6; Brad Peacock, 705-897-1435 (Brad); email: soarsudbury1@hotmail.com



The All New R.C. World, Hamilton, Ontario L0R 1W0; Dave, Larry or Brian, (905) 765-2301 or (905) 333-3297



Thompson Valley R/C Raceway, Kamloops, British Columbia V2C 4P3; Brent Wendle, (250) 376-7843; email: tvrrc@shaw.ca

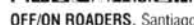


Vancouver R/C Road Racers, Coquitlam, British Columbia V3E 1K9; Roger Brown, (604) 945-3888



CHILE

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OFF/ON ROADERS, Santiago, Region Metropolitana 1; Mauricio Wetter Ferrer, (56) 09-8404174; email: mwetter@entelchile.net; web: 38939070.home.icq.com/



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Club De Automodelismo Colombiano, Sanatafe De Bogota D.C., Bogota; Jorge Delgado, 1-6130588



Garoso Raceway, Cucuta, Gabriel Rodriguez, 975-751892



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Club de Automodelismo RC10 Costa Rica, San Jose, San Jose; Osvaldo Averhoff A, (506) 2862353; email: nitrocr@hotmaill.com



Hobbymania, Hispanidad San Pedro, Montes de Oca; Randall Jimenez, 506-280-9078; email: hobbymanias-tore@hotmail.com; web: www.hobbymanias.com



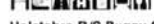
CYPRUS

Racing Model Club, Nicosia; Andrea Sotiriou, 493186; fax 493229



DENMARK

Brondby Motor Club, Brondby 2605; Soren Boy Holst, 45-36-472-462



Holstebro R/C Buggy Club, Holstebro 2600; Michael Brusholt, 45-97-412-734



Klub 144 Raceway, Lyngby 2800; Henrik Carstens, 45-42-88-3691



Rainbow Raceway, Copenhagen 2600; P. Christiansen, 45-52-848-504



Thor Minirace Odense, Odense N 5240; Ulrich Rasmussen, 45-65-303-707



DOMINICAN REPUBLIC

Adoca R/C Speedway, Santo Domingo, (809) 220-5266



La Barranquita R/C International Speedway, Santiago, (809) 582-2303



ENGLAND

Chessington Radio Car Club, Worcester Park, Surrey; Ian Spiller, 0252-20657



Hampshire Racing Center, Basingstoke, Hampshire; Tony Eudola, 44-1276-61402



Hinckley RCCC, Hinckley, Leicestershire; Bruce, 01455-890580



Snetterton Market Model Car Club, Norwich, Hampshire NR16 2JU; Lee Shore, 01760 724857; email: kekeza@fsmail.net; web: www.wheelspins.co.uk



Worcester Model Car Club, St. John's, Worcester WR2 609; Mr. Hardy



FRANCE

Auto Electron, Limoges 87000; M. Boudoul, 55 062763



Auto Model Club de l'ouest, Lojheret 29470; Peuziat Michel, 98071764



Crame Roncq, Mons el Baroeul; Michael Hondekyn, 33-20042755



CSRM, Lyon 69009; Pierre-Yves Montfroy, 06 78880852



Lorgies Bolides, Lorgies 62840; Hourdequin Sabine



GERMANY

Dreykorn Raceway, Lauf 91207; Hermann Hensel, 09123-81457



MAC Zweibruecken, Hueffler 66909; Matthew Bailey, 011-49-6384-1388; email: matthew_w_bailey@hotmail.com; web: www.geocities.com/matthew_w_bailey



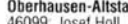
MC Koln, Worringer 50769; Ralf Habel, 02733-477493



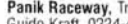
Mini Car Club Dortmund, Dortmund 4600; Roland Schwan, 0231/213609



Oberhausen-Altstadt, Oberhausen 46099; Josef Holl, 0208-403676



Panik Raceway, Troisdorf 53844; Guido Kraft, 0224-400259



HONDURAS

Autodromo Accion, San Pedro Sula; Colonia Rivera Hernandez; Eduardo Hondal, (504) 52-2061



HONG KONG

H.K.R.C. Model Car Racing Club, Hong Kong; Alex Chan, (852) 659-2622



Kingsville Buggy Arena, Shatin; Pak Yeung, (852) 607-0828



INDONESIA

Abadi Circuit, Bandung, Jawa Barat 40141; Adi Darmawan, 62-22-2012250; email: darmawaa@bdg.cen-trin.net.id



Ancol, Jakarta, 62 14350; Andre Supriyanta, 62 21 6506040; email: andre@cbn.net.id; web: www.uvvis.com/ja



Jakarta International Twin Circuit, Dki Jaya, Jakarta; Fayakhun Andriadi, 6221-7512439; email: fayakhun@soon.com



Karinda Off-Road R/C Car Model Circuit, Jakarta-Selatan 12440; Wiwid W. Soedarmadi, 62-21-7900878



Pondok Cabecircuit, J.L. Kunir No. 83, Jakarta; Ali Agus Salim, 7403568-9; fax 7491533



ISRAEL

IRCCA On-Road Raceway, Rishon Lezion 75650; Shachar Ken-Dror, 972-56-470037; email: dawn@dawn.co.il; web: www.touring-car.up.co.il



Nahshoneat, Haifa 32809; Golan Levy, (972) 039386444 or (972) 04231252



ITALY

AF MODELS RINGS, COLLEGNO, ACT 10093; ADRIANO FORATO, +39.335.82.58.434; email: afmodels@m-net.it; web: www.afmodels.com



JAPAN

Kadena R/C Car Club, APO, AP 96367; Ron Nason, 011-81-611-733-1334; email: Ron_Nason@hotmail.com; web: home.attml.jp.jp/b/Carmen_Nason/me.htm

Xiwakuni R/C Track, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662



Yokota R/C Racers, APO, AP 96326-0034; John Baker, 90-001-81-31175-7-6471; email: aa4b@ytla.attml.jp.jp



KUWAIT

Inferno DX 4WD Track, Ahadi 61002; Yousuf Acqatari



LEBANON

Wild Willy RCC, Beirut, 00961-4-403751



MALAYSIA

ACME SPEEDWAY, Georgetown, Penang, PB 10000; MOEY CHEE CHEONG, 604-2613175 & 6012-4189388; email: s_jamm@hotmail.com



Jump Square Arena, Selanhor; Thomson Chong, (603) 656-2513



Niko Sales & Service Centre, Johor Bahru; Niko Cheng, (607) 234-3615; email: niko3@pd.jaring.my; web: www.niko.com.my



Titawangsa Raceway, Kuala Lumpur; R.A.C.E. Sdn Bhd., 03-2614496



TP Racing R/C Raceway, Selangor; WONG SOO WEI, +603 56388160; email: wong@tp-racing.com

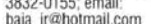


MEXICO

Alces Off Road, Ensenada, BC 22830; Jorge Bustamante, 667-6-1476, 61477, 86729



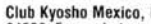
Baja JR, Guadalajara, Jalisco 45000; Memo, Pancho, 33-3671-5432/33-3832-0155; email: baja_jr@hotmail.com



Club Dinamo Monterrey, Monterrey, Nuevo Leon 64890; Daniel Ornelas Elzondo, +52 (818) 3574588; email: daniel26or@hotmail.com



Club Kyosho Mexico, Mexico, DF 04330; Fernando Lopez, 52 55 (56894150); email: Omega@avantel.net; web: www.speedshopmexico.com



Desstreza Racing Club, Aguascalientes, Aguascalientes; Luis Lopez, 44 98 961296; email: luis_lopez@jabil.com



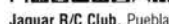
Hobby Centro, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28



Hobby Model's Raceway, Morelid, Michoacan 58260, 431-5-01-22



Hobby's Formula, DF 01120, 905-502-3620



Jaguar R/C Club, Puebla 72150; Denise or Chiro, 22-31-00-91, 22-33-00-94



La Hielera, Queretaro, QRO 76160; Jorge Morelos Rabell, 42-12-15-25



Micromotori Club, Jalisco, Jalisco 44640; Francisco Ortiz Sevilla, 52-36418672; email: fstmyr@hotmail.com



NITRO RACERS, san jose del cabo / los cabos; FRANCO MEZA, (114) 1424422; email: tcstafe@prodigy.net.mx



Pista Casino, Cuernavaca, Morelos 16507; Luis Duhat, 73-19-12-38



R/C Racing Club, Zapopan, Jalisco 44560; Fernando Hernandez, 3-616-73-47



Tony's Track, Culic-n, Sinaloa; Guillermo Prieto, 67-165708-168141

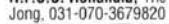


NETHERLANDS

ERCE Eindhoven, Eindhoven, ACT 5627N; Henk Fick, 040-2480607; email: info@erceracing.nl; web: www.erceracing.nl



H.F.C.C. Hollandia, The Hague; G. de Jong, 031-070-3679820



M.A.C. Vlymen, Nieuwkuijk; Arjan van de Graaf, 31-416-376298



R.C.T.D. Circuit, Dordrecht, Zuid Holland 3316 GN; Jan van Kooy, 31-78-618-11-84; email: pkracing@bit.nl; web: www.pkracing.nl



NEW ZEALAND

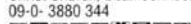
Capital Model Racers, Lower Hutt; Roger Whitmarsh, 04-566-5714



Counties R/C Raceway, Pukekohe; R Northcott, 09-23-86904



Harewood Radio Control Car Club, Christ Church; Dean Johnson, 09-0-3880 344



Papakura Indoor R/C Car Club, Auckland; Colin Perry, 09-298-4711



Western District R/C Off-Road Car Club, Auckland; Chris, 09-838-5201



NORWAY

Aurskog R/C Club, Aurskog; Tommy Gjeleseth, 47-63-86-21-61



Dalen Raceway, Molde; Johnny Reitan, 94 64 52 95



Hadeland Raceway, Gran; Dag Bakke-Nilssen, 61330405



Lornskog RC Bane Track, Sorlihavna; Terje Rosemo, 47-952-44269

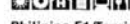


Store-Baller Raceway, 3/17/99 61330225; Ola Raastad



PHILIPPINES

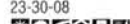
Boyel R/C Hobby Shop, Rizal; Jose Chua, 721-2555



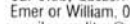
Philippine F1/Touring Club, Quezon City, Manila 1156; Raymond Aguilar/Ron Villalor, 896-64-15/23-30-08



Philippine R/C Association, Manila, Manila; Ronald/Manny Villalor, 23-30-08



QCRCC Quezon City Radio Control Car Club, Quezon City 1008; Desthy, Emer or William, 0917-8911698; email: emerlitoa@quickweb.com.ph; web: www.qcrcc.cjb.net



PORTUGAL

Aero Clube da Madeira, Madeira, fax 091-221265

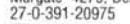


SOUTH AFRICA

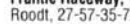
B.R.C.A. Bokisburg Radio Car Association, email: recycle@netactive.co.za; web: www.recycle.co.za



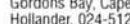
Banana County R/C Racing Club, Margate 4275; Dennis Steenmans, 27-0-391-20975



Frantic Raceway, Welkon; Wayne Roodt, 27-57-35-72849



Gordons Bay R/C Club (GBRC), Gordons Bay, Cape Province; Andre Hollander, 024-512865



Grand Prix Electric Car Club, Boksburg, Gauteng; Gary Gibson, 27

R.C. Superbowl, Elsburg,
Johannesburg; Karl Fawcett,
27119076145



Rustenburg Off-Roaders, Rustenberg,
Northwest Province; Jan Van
Vollenhoven, 0142- 24-846



SPAIN

A.D. Diablos, Zaragoza; Carlos
Vicente de Vera, 34-76-605350



ADAM, Madrid; Alvaro Sarabia,
01-7471113



Club Modelismo Catilla, Burgos
09080; A.J. Pereda, 34-47-240130



Club Social Sevillana, Granada; Oscar
Saenz, 958-275282



CRAEM, Madrid; Pablo Llorente,
91-3865952



Motoclub Castellon R.C., Castellon;
Octavio Traver, (34) 64 229705,
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Outlaw-Ultima II, Madrid 28016;
Juan Vacas, 915197298



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Amalie Racetrack, Sollenbrunn
5-46632; Tage Johansson



PROCAR Speedway, Veddige 430 20;
Lars Nordin, 46-0-340-38784;
fax 46-0-340-38694; email: info@pro-
car.se; web: www.procar.se



Sollenbrunn Miniracing Club,
Alingsaas; Tage Johansson, 46-322-
40944; email: tage.j@swipnet.se



Staffanstorps Highway 1:8 Track,
Staffanstorps 245 45; B'rie Petersson,
46 0 46-256832



torvinge raceway, rappestad, SP
59047 vikingstad; mats johansson,
013-808445; email: mats.j@swipnet.se;
web: drive.to/miracl

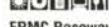


**Touring 1:10 Raceway (& Mini-Z
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Mikael Nilsson, +046 457 160 07;
email: micke12@telia.com; web:
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E.M.B.C.M. Raceway, Seinen CH-
8854; Markus Schmid, 41-1- 8605229



ERMC Raceway, Grand-Saconnex
1218; M. Maurer, 19-41-22-798-9765



JMRCV-Terrain du Levant, Geneva
1290, fax 19 41 22 7790805



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Thuwachardenpanich, 66-34-258808;
email: hobbica@yahoo.com



Hot Rod Raceway, Bangkok 10310;
Mr. Vichai Vongphate,
(662) 8602922-5



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B&B OTO G.ven Raceway, Istanbul,
0216-4186116, or 0216-3490742



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R/C Mariche, Caracas DF 1070-A;
Bruno Morganti, 58-02-241-3969 or
241-4993



Santa Paula R/C Club, Caracas;
Abecasis or Franco Agrusa,
02-2423954 or 02-4510314



WEST INDIES

Island Raceway, St. Andrew, Jamaica;
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NEW OPTIONS! We now have two new symbols to help
our readers find your tracks!



Road course layout



Mini and micro RC cars (Kyosho Mini-Z, HPI Micro RS4, etc.).

To update your current listing, email:
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Check all that apply

- ☐ Indoor
- ☐ Outdoor
- ☐ Off-road
- ☐ On-road
- ☐ Oval
- ☐ Dirt

- ☐ Carpet
- ☐ Concrete
- ☐ Asphalt
- ☐ Minis & Micros
- ☐ On-site hobby shop

- ☐ AC power
- ☐ Automatic lap-counting
- ☐ Food available

KEY TO SYMBOLS

- | | |
|-----------|--------------------|
| Indoor | Concrete |
| Outdoor | Asphalt |
| Off-road | Minis & Micros |
| On-road | On-site hobby shop |
| Oval | AC power |
| Dirt oval | Auto lap counting |
| Carpet | Food available |

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RANDOM RADIO CONTROL RAMBLINGS

BY PETER VIEIRA

CLASSIC PLASTIC

HAVE YOU EVER FOUND an old Tower Hobbies catalog under your bed, come across an old Pure-Tech battery strap, or stumbled across a Hirobo Alien at a yard sale and found yourself instantly transported back in time? Us too. This month, we thought it would be fun to pile into the way-back machine for a trip to the '80s and a look at some classic kits and images from the days when bodies were hard plastic (and so were the tires), knowing how to set up a wiper speed control actually mattered, and "ready to run" is what you got after you spent eight hours at your workbench (and you loved it!).

◀ VINTAGE POWER

When this O.S. Engines VF-BR .21 was a hot powerplant, machined heat-sink heads were unheard of, but it has a few interesting features: check out the crankcase; the nose is a separate component and can swap places with the backplate. If you wanted to have a "front-exhaust" engine, the VF-BR could do the job.



◀ START BUILDIN'!

Just about all the Japanese kits looked like this under their box lids. This is a Kyosho Stinger MK II. With a presentation like this, how could you not be excited about building?

◀ BROWN BOX

This is the first ever Futaba wheel radio, the 2F. Using a wheel instead of a stick was breakthrough enough; the throttle trigger and pistol grip would have to wait! Other features include a metal body and battery access that was labor-intensive, to say the least: you had to remove four screws and then completely take the back of the radio off!—all this for \$120, according to the price tag still on the box.



Blazin' Blazer



Toyota Hi-Lux



Bruiser

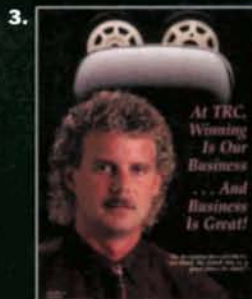
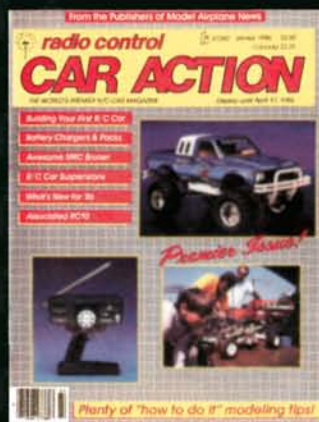
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RCCARACTION.COM
SEE VINTAGE TAMIYA VIDEO

▲ TRUCKIN, TAMIYA STYLE.

Here's a real slice of history. Most people think the Bruiser was Tamiya's first, heavy-duty, steel-chassis truck, but the Toyota Hi-Lux and Blazin' Blazer came before it. They all had 3-speed gearboxes, 750 motors and virtually all-metal construction, but the Hi-Lux and Blazer had a really trick bonus feature: manually lockable front hubs! RC trucks have never been more "real."

CLASSIC ADS

RC Car Action, issue number one! The year was 1986, and the cover stars included the Tamiya Bruiser, Futaba's first Magnum radio and some kid with a bowl haircut getting way too close to a Tamiya Frog.



1. Remember this one? We doubt Jammin' Jay Halsey can fit into a 1/10-scale buggy like he used to. This fully detailed RC10 is still one of the all-time coolest-looking buggies.

2. In the '80s, the market for radios aimed directly at conjoined twins was booming.

3. This ad really made us want to buy something, and that something was Jheri Curl. We hear the Greatest-American-Hero-meets-Jermine-Jackson look is making a comeback.

4. We know Mugen for its 1/8-scale nitro buggies, but they were electric in the '80s. The Bulldog had fashionable 4-wheel steering, belt-driven 4WD and air shocks. Air shocks!